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A BIO-BIBLIOGRAPHICAL STUDY OF HUNAYN IBN IS-HAQ AL-IBADI (JOHANNITIUS) (809–877 A.D.)

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"Honein est la plus grande figure du IX^e^ siècle. On peut même dire qu'il est une des plus belles intelligences et un des plus beaux caractères que l'on rencontre dans l'histoire."[1]

Abu Zaid Hunayn ibn Is-haq al-Ibadi[2] physician and philosopher, author and translator, stands preëminently as the dominating figure at the beginning of the evolution of Arabic medicine. His translations of Galen, Hippocrates, Plato, Aristotle, Dioscorides, Ptolemy and other Greek authors formed the cornerstone on which the edifice of Arabic science was built. "The importance of this activity can be measured in another way by stating that the translations prepared by Hunayn and his school were the foundation of that Muslim Canon of knowledge which dominated medical thought almost to modern times."[3]

[1] Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 139.

[2] Al-Ibadi is derived from the name of an Arab tribe which inhabited Hira Iraq and adopted Christianity upon its advent to Paganist Arabia.

[3] Sarton, George, Introduction to the History of Science, (Baltimore, 1927), Vol. 1, p. 611.

During the ninth century Hunayn was the most radiant luminary on the horizon of learning throughout the world. He was born at Hira (Iraq) in 809 A.D.[4] but spent his early youth in Basra. His Arabic teacher was al-Kahlil ibn Ahmed, the founder and author of Arabian prosody. He is also reported to have studied in the famous Gunde-Shapur school in Khuzistan under the illustrious physician Yuhanna ibn Masawayh.

Ibn Abi Usaybi'a, the famous historian of Arabic medicine, quotes Yousof ibn Ibrahim, a contemporary of Hunayn, as saying, "As soon as Hunayn undertook to study in order to master the art of Medicine, he began to attend the circle around Yuhanna ibn Masawayh (777–857 A.D.) who was the most renowned for his knowledge of medicine and for the diversity of his intellectual pursuits."[5] Yousof ibn Ibrahim further says, "I knew Hunayn as a translator. He used to read to Yuhannah a text-book on medicine entitled in both Greek and Syriac, *Behrasis*, which is Galen's *De Sectis*." Hunayn's intellectual curiosity became so annoying that Yuhanna grew very tired of his disciple. One day while reading from the text-book, Hunayn paused and requested his teacher to elucidate a problem he found in it. Now it happened that Hunayn was the son of a money-changer from Hira[6] whose citizens were regarded with contempt by the people of Gunde-Shapur,

[4] Concerning Hunayn's date of birth, we have no less authority than himself, for he had stated clearly that when he composed his risala to Ali ibn Yahya on Galen's work, he was forty-eight years of age. It was then 1167 in the al-Eskander era which corresponds to (242 A.H.) and (809 A.D.). This account agrees fully with Usaybi'a. Furthermore Usaybi'a gives the date of Hunayn's death to have occurred in the 1188 al-Eskander era which corresponds to (264 A.H.) and (877 A.D.).

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, Leipzig, 1925, p. 53.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 190.

[5] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 185.

[6] Ibn al Qifti states that Hunayn's father was a prominent Nestorian Apothecary. Ibn al Qifti's Tarikhu'l-Hukama, Arabic Edition, Saada Press, (Cairo, Egypt, 1326 A.H.), p. 120.

particularly by the physicians of that city. Yuhanna became angry at this questioning by his pupil and said, "Why should a Hiraian want to study the art of medicine?", and suggested angrily to Hunayn that he borrow money from his relatives, buy some merchandise and sit on the streets peddling his wares and exchanging money. Said the master to his pupil, "In your case business will be more profitable than the study of medicine." Thus Hunayn, hurt and grieved, was expelled from the circle of the renowned physician. Yousof ibn Ibrahim then tells how he met Hunayn again, when visiting a sick friend, and at first did not recognize him for his face was covered with hair, but as Hunayn paced back and forth reciting verses from Homer in the original Greek Yousof ibn Ibrahim knew him by his voice. Hunayn, who had thought himself completely disguised, besought Yousof ibn Ibrahim not to tell anyone of their meeting. Three or four more years elapsed before the two met again. The second meeting was at the house of the famous scholar Jibra'il ibn Bukht-Yishu (829 A.D). Then Yousof ibn Ibrahim discovered that Hunayn had translated some parts of Galen's book on anatomy for Jibra'il ibn Bukht-Yishu, having acquired the Greek language as a prerequisite for the study of medicine. Much to Yousof ibn Ibrahim's astonishment he heard the great scholar address Hunayn as "Rabban" which means "master". Seeing that Yousof ibn Ibrahim was amazed at the honor accorded Hunayn, Jibra'il ibn Bukht-Yishu said, "If God grant him long life this youth will surpass Sergius."[7] A little later when Yousof ibn Ibrahim and Hunayn were outside, Hunayn said, "Now I want you to reveal everything and spread abroad what you have heard Jibra'il ibn Bukht-Yishu say about me," and giving Yousof ibn Ibrahim a copy of the translation he had made for Jibra'il ibn Bukht-Yishu remarked, "This will complete the humiliation of Yuhanna. Deliver it to him but do not name the translator. When it arouses his admiration then you may inform him it is my rendition." Yousof ibn Ibrahim reports that he fulfilled the commission before returning home and that when Yuhanna read the chapters which the Greeks call the

[7] Sergius of Ra's al-ain in Iraq (536 A.D.) physician and philosopher, one of the greatest translators from Greek into Syriac. Some of his translations were revised later by Hunayn ibn Is-haq.

Activators he became exceedingly astonished and exclaimed, "Has Jesus inspired some one in this age?" Yousof ibn Ibrahim says that he replied, "Jesus has inspired nobody either in this or in any other age; nor is he able to inspire anyone," and further quotes Yuhanna, who was a great Christian and abhorred Yousof ibn Ibrahim's blasphemy, as saying, "The one who is capable of such a rendition must be inspired by the Holy Ghost." When informed that it was the work of Hunayn, the man he had expelled with insults from his circle, Yuhanna swore it was not true. Later he begged Yousof ibn Ibrahim to reconcile him with Hunayn whom he held ever after in friendship and highest esteem.

Hunayn stated that, while a youth, he translated into Syriac Galen's "*De Differentiis Febrium*" for Jibra'il. This was his first translation of Galen's work. He followed this by translating Galen's "*De Facultatibus Naturalibus*" at the age of seventeen for the same patron.[8] Greatly impressed by Hunayn's ability and scholarship Jibra'il recommended the young scholar to Caliph Al-Ma'mun (813–833 A.D.), who appointed him director of the Academy Baytu'l-Hikmat (House of Wisdom). In the library of this institution Hunayn found many manuscripts which had been collected from different parts of the Islamic and Byzantine empires and prodigiously applied himself to the task of translation. In order to collect more manuscripts, al-Ma'mun sent an expedition of scholars to Syria, Palestine, Egypt, and to all parts of Byzantium, and it is reported that he paid Hunayn the weight of the books in gold for translating them.[9]

Not only the Caliphs but those surrounding him were intensely interested in advancing scholarship. Thus we see three noted schol-

[8] An Arabic manuscript of "*De Differentiis Febrium*" dated 527 A.H., is in the possession of Issa Iskandar Malouf of the Arab Academy of Damascus, Syria. Malouf, Issa Iskandar, History of Arabic Medicine, Second lecture delivered before the Arab Academy of Damascus, Syria, Arabic Edition, (Damascus, Syria, 1925), p. 51.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, Leipzig, 1925, p. 15.

[9] Az-Zerkili K., Kamus-al-A'-Lam-, Arabic Edition, Arabic Press, (Cairo, Egypt, 1927), Vol. 1, p. 278.

ars[10] also encouraging Hunayn and others assisting him by a monthly stipend of five hundred dinars (about a thousand dollars) in order to facilitate his work of translation.

After the death of the Caliph Al-Ma'mun, Hunayn continued his work under the patronage of the two successive Caliphs and accomplished the translation of medical and philosophical works of Hippocrates, Galen, Oribasius, Paul of Aegina, Dioscorides, Aristotle, Plato and others.

Usaybi'a relates that Hunayn's reputation reached its zenith during the Caliphate of al-Mutawakkil (847–861 A.D.). At that time he was assisted by a staff of translators, among whom were his nephew Hubaysh, his son Ishaq, and many of his pupils. This Caliph, in order to test Hunayn's professional ethics, asked him to prescribe a poison to be used to destroy one of the Caliph's enemies and offered a rich reward for his compliance. When Hunayn refused, he was imprisoned and kept under close surveillance for a year. During this time he continued his work of translating Greek medical and philosophical works. At the close of the year he was brought before the Caliph and told he must either yield to the master's demand or die. Hunayn replied, "I have learned only to save life. I cannot destroy it. If the Caliph chooses to kill me the mighty Lord will avenge me on the morrow and thus the Caliph will only injure his own soul." The Caliph, greatly moved by Hunayn's high idealism, asked him what prompted him to take such a stand under the menace of death. Hunayn answered, "My religion requires me to do good unto my enemies and my profession prevents me from inflicting injuries upon any one." Whereupon the Caliph ordered him a very rich reward.

According to Usaybi'a, Hunayn aroused the jealousy of his rivals and became an object of hatred to them. Insinuations as to his loyalty reached the Caliph al-Mutawakkil and it was whispered that his religious beliefs were heretical. There was even brought to the Caliph a tale which said that Hunayn had spit upon the image of Mary and the Child. Then the Caliph condemned him to prison and

[10] The three famous sons of Musa b. Shakir also called the "Three Brothers" were mathematicians, astronomers and patrons of learning, devoting a share of their wealth to the acquisition of science.

torture. Not satisfied with this sentence, the enemies of Hunayn insisted upon his execution, and the Caliph seems to have yielded reluctantly to their demand. At this time the Caliph was sick and none of the physicians who had sought Hunayn's ruin could relieve their master. On the night previous to the day set for the execution, the Caliph dreamed that a majestic figure was approaching him and that behind this figure walked another. The first proclaimed himself

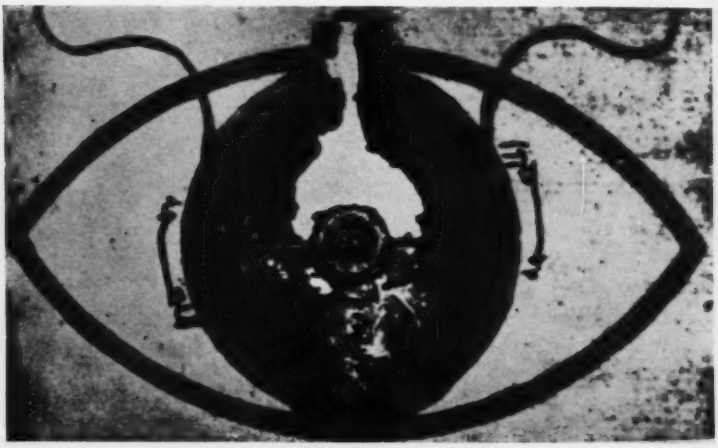

FIG. 1. THE FIRST OF THE EARLIEST KNOWN DIAGRAMS OF THE ANATOMY OF THE EYE

From the Arabic manuscript of Hunayn's Ten Treatises on the Eye, at the Taimûr Library, Cairo, Egypt. Courtesy of Dr. Max Meyerhof.

the Christ and said, "This man with me is Hunayn whom you have unjustly imprisoned. He is the only man who can cure you. Listen not to his enemies." On the morrow the Caliph ordered that Hunayn be released and brought to the Court. Then the Caliph begged forgiveness of Hunayn and bestowed upon him much wealth so that henceforth he lived in ease and uninterruptedly pursued his work in the House of Wisdom.

It seems incredible that a man who had been entrusted with the work of translation in the House of Wisdom and who had enjoyed the confidence of the Caliph should be excluded from his favor because of jealous rivals. However, the Caliph may have ordered Hunayn's arrest in order to appease the public—Christian and Muslim alike, for the latter as well as the former revere the Virgin Mary, accept the doctrine of the immaculate conception and Christ as a prophet.

Commentaries report Hunayn's nobility of character, diligence and devotion to duty. Certainly he lived up to the letter of the Hippocratic oath which he transmitted through his translations to the physicians of the Middle Ages. Little mention was made of his personal life except that he lived fully. Usaybi'a relates his daily life by saying, "When Hunayn would alight from his mount each day, he used to take his bath and wrap himself in velvet. A pitcher of silver containing a ratl of wine and a cake moistened with the broth of meat was always ready for him. It was his habit to eat and drink while completely relaxed, until he had fully sweated. Then he might sleep, and awaken to be perfumed with incense and have his meal which consisted of a fat boiled fowl and a full loaf of bread. Customarily, the order of his meal was soup first, then fowl and bread. After dining, again he slept. When he awakened he would drink four ratls of aged wine. When he desired fruit, he ate Damascus apples, pomegranates and quinces."[11] The details of his death are wrapped in obscurity. He was survived by two sons, Da'-ud and Is-haq. He had compiled for them numerous works on medicine, and translated for them many works from Galen. Da'-ud did not distinguish himself—the only work he left was a pandectes. Is-haq, on the other hand, became famous and distinguished himself in medicine, on which he left several works. Is-haq also translated many works from Greek into Arabic, but he cared mostly for the philosophical work of Aristotle and others.[12]

[11] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 189.

[12] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 188.

THE PLACE OF HUNAYN IN THE EVOLUTION OF ARABIC SCIENCE AND ITS TRANSMISSION FROM GREEK SOURCES

To evaluate properly the importance of Hunayn's rôle as a transmitter of knowledge, one should remind oneself that Arabic scientific knowledge until Hunayn's time was not only meagre in content but lacked an adequate terminology which is so necessary for the transmission of thought. Although translation of Greek knowledge into Syriac began about the first half of the sixth century A.D., before the Arab invasion, and Sergius of Ra's al-ain (d. 536 A.D.) and others had rendered many important Galenic works into Syriac, most of these translations were of inferior quality. However, activity in translating Greek knowledge into Arabic began about the latter part of the eighth or the beginning of the ninth century and reached its full sway when Hunayn and his school began the task under the patronage of Arab statesmen and scholars. Here we notice the Caliphs and their ministers, as well as others of their courts, out-doing each other in encouraging the collection and translation of Greek knowledge.[13] Usaybi'a mentions the names of at least fifty translators engaged in this undertaking.[14] Undoubtedly, Hunayn towers above all his contemporaries in his accuracy and extremely scholarly methods of collating and translating Greek manuscripts. He had a complete mastery of Greek, the scientific language of the time. His knowledge of Persian, Syriac and Arabic surpassed that of previous translators, enabling him to revise inaccurate renditions of his predecessors. In the process of translation Hunayn not only created a terminology but also filtered the subject matter through his own intelligence. It is no wonder, then, that no less a person than Usaybi'a expresses his admiration when he compares Hunayn's translations with those of others.[15] So

[13] Even the ladies of the harem were patrons of learning. Hunayn wrote a treatise on Birth at Six Months to the mother of Caliph al-Mutawakkil. Ibn al Qifti, Tarikhu'l-Hukama, Arabic Edition, Saada Press, (Cairo, Egypt, 1326 A. H.), p. 119.

[14] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan (Cairo, Egypt, 1882), Vol. 1, p. 203–206.

[15] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 189.

exacting was Hunayn's scientific honesty that he retranslated many of his works of his early youth. Bergsträsser believes that Hunayn and his pupil, Hubaysh, presented the material from the Greek texts as clearly and as accurately as it can be presented.[16] This is not astonishing to those who are acquainted with the flexibility of the Arabic language. "Arabic is the Greek of the Semitic world, and it was a fortunate event for the march of science to have found expression in Arabic at that time. Aramic was a poverty stricken tongue compared with Arabic, and not even classical Hebrew at its best could rival Arabic in its astonishing elasticity. From its own inner resources it could evolve by autogenous processes the '*mot juste*' which new arts and sciences demanded for their intellectual expression."[17] Bergsträsser took exception to Simon who accused Hunayn and his disciples of vulgarism and asserted that, though their style was not always elegant, it was at least literal. Of course Hunayn bears the mark of a master, for his forceful expression is rendered without tautology.[18]

E. G. Browne is of the opinion that the translation from Greek into Arabic was generally effected with much greater skill and knowledge than the later translation from Arabic into Latin, and that he who judges Arabian Medicine only by the latter will inevitably undervalue it and do it great injustice. Indeed it is difficult to resist the conclusion that many passages in the Latin version of the *Qanun* of *Avicenna* were misunderstood or not understood at all by the reader."[19] Hunayn translated from Greek into Syriac and from Syriac into Arabic, but he often also translated directly from Greek into Arabic. Le Clerc ventures the opinion that Hunayn's translation into Syriac was executed mostly for his co-religionists, but that when he translated for his Muslim patrons he translated directly into Arabic.[20]

[16] Bergsträsser, G., Hunain ibn Ishak und seine Schule, (Leiden, 1913), p. 28–30, also p. 48.

[17] Guillaume, Alfred, in the Legacy of Islam Edited by him and Sir Thomas Arnold, Oxford Press, (London, 1931), p. VI.

[18] Bergsträsser, G., Hunain ibn Ishak und seine Schule, (Leiden, 1913), p. 28–30 also p. 48.

[19] Browne, E. G., Arabian Medicine, (Cambridge, 1921), p. 26–27.

[20] Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 144.

A specimen of Hunayn's own work is available to us through the painstaking work of Bergsträsser, who is known for his erudition, covering that whole period of translation. In 1925 Bergsträsser published a pamphlet the basis of which is an extant manuscript by Hunayn. This is treasured in the library of Aya Sofia (Mosque) in Istambul. It bears the number 3631 and is a *risala*[21] written by Hunayn (in 856 A.D.) containing a list of all the books of Galen which had been translated and some which had not been translated, 129 in number, with mention and criticism of the Syriac and Arabic translations of them. This very important list was compiled by Hunayn at the request of his patron, Ali ibn Yahya, who was the Vizir of Caliph al-Mutawakkil. Bergsträsser edited the text of this manuscript in Arabic and translated it into German, adding to it a list of the original Greek titles.[22] Shortly after Bergsträsser had edited this manuscript, H. Ritter discovered in the same library another manuscript by Hunayn (number 3590) containing the list of Galen's authentic and spurious works. A photostatic copy of the same was obtained by Dr. Max Meyerhof, who in turn submitted it to Bergsträsser for criticism. Thereupon the latter was prompted to visit the library of Aya Sofia (Mosque) in order to have a first-hand knowledge of these two manuscripts.[23]

It may be illuminating to give here the English version of the preface of Hunayn's risala (number 3631) which may carry the reader to that period of translation and give him a unique contact with the scientific tradition of that period. It gives also a picture of the social and cultural environment that was so stimulating to the scholars of the time. This preface, I translate freely and briefly from the Arabic text.

[21] The writer has retained the word *risala* because it means more than any English equivalent he can find. Meyerhof translates it 'missive.' It may also be a pamphlet or short treatise. He translates *kitab* as 'book,' and *maqala* as 'treatise,' although it could mean article or discourse.

[22] Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925).

[23] Bergsträsser, G., Neue Materialien zu Hunain ibn Ishaq's Galen-Bibliographie, (Leipzig, 1932), p. 7–9.

A RISALA FROM HUNAYN IBN IS-HAQ TO ALI IBN YAHYA ON ALL THE BOOKS OF GALEN WHICH, AS FAR AS HUNAYN KNOWS, HAVE BEEN TRANSLATED AND ON SOME OF THEM WHICH HAVE NOT BEEN TRANSLATED[24]

"You have mentioned, may Allah honor you, the necessity for a book in which shall be compiled the authentic works of the ancients dealing with medicine. The purpose of the book is to enumerate not only the treatises but also the sections in each treatise thereby making easier the work of the student who seeks only certain parts of the treatise.

"You have requested me to attempt this work for you, may Allah aid you. My recollection is inadequate to circumscribe all these books; for I lost whatever collections I had of them. There was a Syriac man who asked me, after my collection was lost, to make the same kind of compilation of Galen's works and requested me to indicate also what I and others had translated of these books into Syriac or other language. I wrote for him a book in Syriac according to the way his question was propounded. You have asked me, may Allah honor you, to translate for you that same book hurriedly into Arabic. I am acting according to your request, if Allah may will. If Allah shall grant me the restoration of these books through your hand, I will then add to them whatever I have forgotten of Galen's works and mention whatever we had found of the ancient works on medicine.

"It happened, may Allah exalt you, that first of all I prefaced that book by naming the man for whom it was written and describing what he asked. You also have asked me to enumerate for you the books of Galen and their titles, what the title of each is and what his aim in each, how many treatises in each and what is described in each treatise. I have informed you that Galen wrote a book entitled *Index* after this manner in which he enumerated his works, and that he wrote another treatise describing the order in which his works should be read, and that to know Galen's books through Galen himself is better than knowing them through me. Your answer was, 'Even if what you have

[24] Ali ibn Yahya was the Vizir and the friend of the Caliph al-Mutawakkil. He commanded the Arab army on the northern frontier against the Byzantine Empire (860 A.D.). He himself was a scientist and a great champion of learning.

said is the truth, still all of us who have that objective, (to know Galen's works) and read books in Arabic and Syriac are in need of knowing what is translated of Galen's books into the Syriac and the Arabic languages and what is not.' You also ask me to indicate what I had translated myself alone and what was translated by others, what others had translated previously, which I myself had reviewed and

FIG. 2. THE SECOND OF THE EARLIEST KNOWN DIAGRAMS OF THE ANATOMY OF THE EYE SHOWING THE DIFFERENT LAYERS OF THE EYE AND ILLUSTRATING PLATO'S THEORY OF LIGHT-RAYS

From the Arabic manuscript of Hunayn's Ten Treatises on the Eye, at the Taimûr Library Cairo, Egypt. Courtesy of Dr. Max Meyerhof.

revised, also to indicate in what order these books were translated by others, the ability of those translators, and for whom the works were translated and who they are for whom I had translated each one of these books, and in what period of my age. Those things are necessary to know, since the translation is commensurate with the ability of the translator. And it was also necessary to know for whom it was translated and what books have not yet been translated and whether

the originals of these were found in Greek or not, or whether only parts were so found. This is necessary so care may be taken to translate what is found and to seek what is not.

"Writing to me what you have written, I know that you are right and that you have called upon me for something the benefit of which I and you and many people share in common; but I, for a long time, argued with you and postponed your request for the reason that I had lost all my books, which I had gathered one by one during my lifetime in all the lands in which I have traveled. My books I lost all at one stroke.[25] I have not even left the book (*Index*) which I have just mentioned in which Galen enumerated his works. Since you have insisted upon my undertaking this matter I was compelled to comply with your request despite the loss of needed means. Therefore since you are satisfied and have accepted what I recollect on this subject I will begin, trusting in the heavenly aid through your prayer for me, everything I know, pouring out everything I recollect about these books beginning with the exposition of the two which I have forementioned."

Hunayn, at this part of his *risala*, went on to enumerate the list of Galen's works, a list which is more comprehensive than that of Usaybi'a. However, the latter's list of Galen's work follows accurately that of the *risala* without making any mention of the translators.[26]

In the light of Bergsträsser's edition of Hunayn's *risala* one can identify positively the many works of Galen translated by Hunayn and his school. This is fortunate, because in Usaybi'a's bibliography of Hunayn's works, he is sometimes so confusing that it is difficult to know which were Hunayn's original works and which were translations. Nevertheless, Usaybi'a's account of Hunayn's bibliography without a doubt is more complete than that of Ibn an-Nadim[27] and

[25] No doubt Hunayn's allusion to the loss of his library was a part of the penalty inflicted upon him when he was charged with heresy by his co-religionists before the Caliph al-Mutawakkil.

[26] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 90–102.

[27] Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), Vol. 1, p. 410.

that of Ibn al-Qifti.[28] Le Clerc's list of Hunayn's work lacked a critical analysis, but now, thanks to Bergsträsser's edition of the *risala*, it can be corrected.[29]

Hunayn and his school were not only important in the evolution of Arabic learning but through Latin renditions of their works had a vital influence in developing medieval science. "It was Hunayn who gave Galen his supreme position in the Middle Ages in the Orient, and indirectly, also in the Occident. Several important works of Galen, though lost in their Greek original, have been preserved for us in the Arabic translations made by Hunayn or his pupils. Thus Hunayn himself relates concerning a work of Galen, now lost, and rare even at that date, 'I sought it earnestly and travelled in search thereof in Mesopotamia, Syria, Palestine, and Egypt until I reached Alexandria. Yet I was not able to find aught save about half of it at Damascus.'"[30]

The importance of Hunayn's work lies in its polymathic nature, for his translation of Plato, Aristotle, Hippocrates, Galen and others had acquainted him not only with medicine but also with logic, physics, metaphysics, rhetoric, history, agriculture, theology and mathematics.

"When the work of Hunayn's nephew Hubaysh and his son Is-haq are added to his there was not a great deal of contemporary knowledge which remained unrepresented in the Arabic language."[31] Thus Hunayn was in a position to develop Arabic terminology for practically every branch of knowledge then in existence. With great justice Withington calls Hunayn the "Erasmus of the Arabic Renaissance."[32]

[28] Ibn al Qifti, Tarikhu'l-Hukama, Arabic Edition, Saada Press, (Cairo, Egypt, 1326 A.H.), p. 119–120.

[29] Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 145–152.

[30] Max Meyerhof in the Legacy of Islam Edited by Sir Thomas Arnold and Alfred Guillaume, Oxford Press, (London, 1931), p. 316–17–18.

[31] Guillaume, Alfred, Legacy of Islam, Edited by him and Sir Thomas Arnold, Oxford Press, (London, 1931), p. 251.

[32] Garrison, G. H., An Introduction to the History of Medicine, W. B. Saunders and Co., (Philadelphia, 1929), p. 128.

I. HUNAYN'S NON-MEDICAL TRANSLATION*

PLATO

(1) Plato's *Politicus*.[33]
(2) Plato's *Laws*.[34]
(3) Plato's *Timaeos*.[35]

ARISTOTLE

(4) Hunayn rendered into Syriac from Aristotle's *Organon* the following:
  (1) Categories.
  (2) Proposition and its part. (De Interpretatione.)
  (3) Analytica Priora.
  (4) Analytica Posteriora.[36]
(5) Aristotle's book on *The Soul* (De Anima). Hunayn translated this into Syriac.[37]
(6) Yahya ibn-al-Bitriq's translation of Aristotle's book on *Heaven and Earth* revised by Hunayn.[38]
(7) Aristotle's book on *Generation and Corruption*. Hunayn translated it into Syriac.[39]
(8) Aristotle's *Metaphysics*. Hunayn translated fragments of it into Arabic.[40]
(9) Aristotle's *Ethics* with Phorphyry's commentary. Hunayn translated it into Syriac.[41]
(10) Collection of commentaries by ancient Greek writers on Aristotle's book *Heaven and Earth*.[42]
(11) The second treatise of Aristotle's *Physics*. Hunayn translated it into Syriac.[43]

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* In many of the works translated by Hunayn the writer was unable to find either in Arabic Histories or in Western literature any mention made as to what language (Arabic or Syriac) the rendition was made.

[33] Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), p. 343.

[34] *Ibid.*

[35] *Ibid.*

[36] *Ibid.*, p. 345.

[37] *Ibid.*, p. 352.

[38] *Ibid.*, p. 350.

[39] *Ibid.*

[40] *Ibid.*, p. 352.

[41] Ibn al Qifti's Tarikhu'l-Hukama, Arabic Edition, Saada Press, (Cairo, Egypt, 1326 A.H.), p. 31.

[42] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

[43] Le Clerc speaks of a manuscript upon Aristotle's *Physics* extant at *Leiden*, the translation of which he is inclined to attribute to Hunayn. Al-Fihrist credits

(12) Nicolas of Damascus' *Summary of Aristotle's Philosophy.*[44]
(13) *Book* on *Plants* attributed to Aristotle.[45]
(14) Themistius' commentaries on Aristotle's *Book on the Soul.*[46]

MISCELLANEOUS

(15) Menelaus' *Spherica.*[47]
(16) Apollonius of Thane's *Treatise on Astrology.*[48]
(17) Some fragments from *Alexander of Aphrodisias.*[49]
(18) Archimedes' book on *Sphere and Cylinder.*[50]
(19) Autolycus' *Revolving Sphere.*[51]
(20) Phorphyry's *Isagoge.*[52]
(21) Ptolemy's *Quadripartitum.*[53]
(22) Artemidoros of Ephesus' *Interpretation of Dreams* (Five Treatises).[54]
(23) Translation of the *Old Testament* from Greek to Syriac.[55]

HUNAYN'S TRANSLATION OF GALEN'S PHILOSOPHICAL WORKS[56]

(24) Galen's book on *Demonstration* (De Demonstratione, Libri XV). Hunayn translated the fragments of the book he was able to find into Syriac.

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him only with the translation of the second treatise. Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 145.

Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), p. 350.

[44] Le Clerc credits the translation of this work to Hunayn. No mention is made of Hunayn by al-Fihrist. Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 146.

Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), p. 355.

[45] *Ibid.*

[46] *Ibid.*

[47] *Ibid.*, p. 374.

[48] *Ibid.*, p. 373.

[49] *Ibid.*, p. 354.

[50] *Ibid.*, p. 372.

[51] *Ibid.*, p. 375.

[52] *Ibid.*

[53] Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), p. 373.

[54] *Ibid.*, p. 307.

[55] Ibn al Qifti, Tarikhu'l-Hukama, Arabic Edition, Saada Press, (Cairo, Egypt, 1326 A.H.), p. 70.

[56] The writer translated into English directly from Arabic sources the titles of Hunayn's Galenic Translations. In identifying these translations Usaybi'a's list of the known works of Galen under Hunayn's Biblio-Biography was checked

(25) Galen's book on *Knowing One's Own Sins and Defects* (De propriorum Cuique Affectuum et Peccatorum Dignotione). Hunayn translated a part of this into Syriac.

(26) Galen's book *The Ethics* (De Moribus Libri IV.). Hunayn translated this into Arabic.

(27) Galen's book on *How to Dispell Grief* (De Indolentia). Hunayn translated this into Syriac.

(28) Galen's book *That the Best People can Utilize their Enemies.* Translated into Syriac by Hunayn.

(29) Galen's book on what Plato has written in his book *Timaeos* (De iis quae Medice scripta sunt in Platonis Timaeo). Hunayn translated the whole into Syriac and parts of it into Arabic.

(30) Galen's book on *Power of the Soul as Related to the Bodily Temperament* (Quod Animi Mores Corporis Temperamenta sequantur). Translated into Syriac by Hunayn.

(31) Galen's book on the *Collected Works of Plato* (Platonicorum Dialogorum Compendia VIII). Translated into Arabic by Hunayn.

(32) Galen's book on the *Primal Mover is Immovable* (In Primum Movens Immotum). Translated into Arabic and Syriac by Hunayn.

(33) Galen's book on *Introduction to Logic* (Institutio Logica). Hunayn translated this into Syriac.

(34) Galen's book *The Number of Analogisms* (De Syllogismorum Numero). Hunayn translated this into Syriac.

II. HUNAYN'S MEDICAL TRANSLATION

HIPPOCRATES

(35) *Aphorisms* (Aphorismi). Hunayn translated it into Syriac.[57]

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with Usaybi'a's list of Galenic work under Galen's Biblio-Biography. These two were verified by Hunayn's list of Galen's work given in his *risala* as edited by Bergsträsser. The Latin equivalents are those given by Meyerhof in *Isis*. Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 197–200 and 90–102.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, Leipzig, 1925, p. 1–53.

Meyerhof, Max, New Light on Hunain ibn Ishaq and his Period, *Isis*, (Bruxelles, 1926), Vol. VIII, p. 690.

[57] Usaybi'a credits Hunayn only with the translation of Galen's commentaries on *Aphorisms* while Le Clerc ascribes to Hunayn the translation of the Hippocratic text. Without doubt this is correct as Hunayn in his own *risala* had clearly stated that he rendered into Syriac Galen's commentaries on the *Aphorisms* with the addition of Hippocrates' original text.

Manuscript of this treatise is extant at the British Museum, No. 5914.

(36) *Prognostics* (Prognostica) Hunayn translated it into Arabic.[58]

(37) The second treatise of Hippocrates' book on *Epidemic* (De Morbis popularibus). Hunayn translated it into Syriac and Arabic.[59]

(38) Large treatise on management (regimen) of *Acute Diseases* (De Morbis acutis). Hunayn translated it into Syriac.[60]

(39) *Airs Waters and Places* (De Aeribus, Aquis, et Locis). Hunayn translated this into Arabic and Syriac.[61]

John Tyler edited the *Aphorisms* in Arabic in Calcutta, 1882.

Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 146.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 40.

Bergsträsser, G., Hunain ibn Ishak und seine Schule, (Leiden, 1913), p. 11–12.

[58] Usaybi'a credits Hunayn only with the translation of Galen's commentaries on *Prognostics*, while Le Clerc ascribes to Hunayn the translation of the Hippocratic text. Hunayn in his own *risala* makes no mention of the Hippocratic text. Manuscript of the *Prognostics* is extant at the British Museum, No. 5914. V. Klamroth edited the *Prognostics* for the Z. D. M. G. in 1882.

Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 146.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen (Leipzig, 1925), p. 40.

Bergsträsser, G., Hunain ibn Ishak und seine Schule, (Leiden, 1913), p. 11–12.

[59] Hunayn in his *risala* stated that he translated separately the second treatise of Hippocrates' original text of the *Epidemic* into Syriac and Arabic. Usaybi'a credits Hunayn further with two more works on *Epidemic*, one incorporating the contents of the first, second and third treatises, and the second, an extract of the whole work. This may be an erroneous repetition.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 41–42.

[60] Usaybi'a credits Hunayn with the translation of Galen's commentaries on Hippocrates' work *Acute Diseases*, while Le Clerc ascribes to Hunayn the main work. This is without doubt correct, as Hunayn in his own *risala* had clearly stated that he rendered into Syriac Galen's commentaries as well as the original text of Hippocrates' *Acute Diseases*. Arabic manuscript written in Hebrew characters is extant at Paris.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 146.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 41.

[61] Usaybi'a credits Hunayn with the translation of Galen's commentaries on Hippocrates' *Airs, Waters and Cities*. Following that he accredits him again

(40) *On Human Nature* (De Natura Humana). Hunayn translated this into Arabic.[62]

(41) *The Oath* (Jusjurandum). Hunayn translated it into Syriac.[63]

(42) *Physician's Office Manual* (De Officina Medici).[64]

(43) *Birth at Eight Months* (De Octimestri Partu).[65]

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with translating Hippocrates' *Airs, Waters and Places.* Added to that is an extract of *Airs and Cities*, and then a chapter on *Airs and Cities* of Galen's commentaries on *Aphorisms.* All these lead one to believe that Usaybi'a may be erroneously repeating the titles of the same work. However, Hunayn in his own *risala* had clearly stated that he rendered into Syriac the Hippocratic text of *Airs, Waters and Places.*

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 43.

[62] Usaybi'a credits Hunayn only with the translation of the third treatise of Galen's commentaries on this work while Le Clerc ascribes to Hunayn the translation of the Hippocratic text. Hunayn's own *risala* fails to mention the translation of the Hippocratic text, in contradiction to Le Clerc's claim for him.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 146.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 44.

[63] Al-Fihrist credits Hunayn only with the translation of Galen's commentaries of *The Oath* while Le Clerc ascribes to him the translation of the Hippocratic text. Hunayn in his *risala* fails to mention the Hippocratic text.

Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), Vol. 1, p. 401.

Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 146.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 40.

[64] Usaybi'a credits Hunayn only with the translation of Galen's commentaries of this work while Le Clerc ascribes to Hunayn the translation of the Hippocratic text. Hunayn in his *risala* fails to mention the Hippocratic text. Manuscript containing most of this work is extant at the Escurial Library.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 146.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 43.

[65] Usaybi'a and Le Clerc both credit Hunayn with the translation of Hippocrates' work *Birth* at *Eight Months.* In his *risala* Hunayn fails to mention the

(44) *Ulcers* (De Ulceribus). Hunayn translated this into Syriac.[66]
(45) *Fractures* (De Fracturis). Hunayn translated this into Syriac.[67]
(46) *Reduction of Dislocation* (Articulations) (De Articulis). Hunayn translated it into Syriac.[68]
(47) *Humors* (De Humoribus). Hunayn translated it into Syriac.[69]
(48) *Nutrition* (De Alimento). Hunayn translated it into Syriac.[70]
(49) *On Winds* (De Flatibus).[71]

GALEN

(50) Galen's *Index of His Work*—medical and non-medical. (De Libris propriis (Pinax Galeni) Translated into Syriac and Arabic by Hunayn.
(51) Galen's book *Showing* the *Order* in which *His Works Should* be *Read* (De Ordine Librorum suorum). Translated into Arabic by Hunayn.
(52) Galen's book on *Sects* [Schools] of *Medicine* (De Sectis). Hunayn translated it into Arabic.

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translation of this work. This work is listed by Usaybi'a under the spurious work of Hippocrates. This view has many modern supporters. Manuscript of the same is extant at Munich.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199 and 33.

Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 146.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 43.

Adams, Francis, The Genuine Works of Hippocrates, William Wood and Co., New York, Vol. 1, p. 78.

[66] Mentioned by Hunayn in his *risala*.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 41.

[67] Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 40.

[68] *Ibid.*

[69] *Ibid.*, p. 42.

[70] *Ibid.*, p. 43.

[71] Usaybi'a credits Hunayn with a commentary on Hippocrates' *Winds* (De Flatibus).

This book is not enumerated by Usaybi'a under the authentic works of Hippocrates but is given in his list of spurious works. This view has many modern supporters.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200 and p. 32.

Adams, Francis, The Genuine Works of Hippocrates, William Wood and Co., New York, Vol. 1, p. 59.

(53) Galen's small book on *The Healing Art* (Ars Medica). Hunayn translated it into Syriac and Arabic.

(54) Galen's small book on *Pulse* to *Teuthras* and other *Beginners* (De Pulsibus ad Tirones) Hunayn translated it into Syriac and Arabic.

(55) Galen's book to Gloucon on *Management of Diseases* (Ad Glauconem de Medendi Methodo). Translated into Arabic by Hunayn.

(56) Galen's book on *The Bone* (De Ossibus ad Tirones). Translated into Syriac and Arabic by Hunayn.

(57) Galen's book on *The Muscles* (De Musculorum Dissectione). Hunayn translated it into Syriac.

(58) Galen's book on *The Nerves* (De Nervorum Dissectione). Hunayn translated it into Syriac.

(59) Galen's book on *Veins* (De Venarum Arteriarumque Dissectione). Hunayn translated it into Syriac and made an extract in Arabic.

(60) Galen's book on *Primary* and *Secondary Elements according* to the *views* of *Hippocrates* (στοιχεῖα) (De Elementis secundum Hippocratem). Translated into Syriac and Arabic by Hunayn.

(61) Galen's book on *Temperament* (De Temperamentis). Hunayn translated it into Syriac and Arabic.

(62) Galen's book on *Naural Forces* (De Facultatibus Naturalibus). Hunayn translated the whole into Syriac and later a part of it into Arabic.

(63) Galen's book on *Causes and Symptoms* (De Causis et Symptomatibus). Hunayn translated it into Syriac.

(64)Galen's book on *The Recognition of Diseases* of the *Inner Body Parts* (De Locis affectis) Translated into Syriac by Hunayn.

(65) Galen's large book on *Pulse* (De Pulsibus). Hunayn translated the whole into Syriac and the first part into Arabic.

(66) Galen's book on *Types of Fevers* (De Typis Febrium) Translated into Syriac and Arabic by Hunayn.

(67) Galen's book on *Crisis* (De Crisibus). Translated into Arabic by Hunayn.

(68) Galen's book on *The Days of the Crisis* (De Diebus Decretoriis). Translated into Arabic by Hunayn.

(69) Galen's book on *The Methods of Healing* (Methodus Mendendi). Translated into Syriac by Hunayn.

(70) Galen's *Large Anatomy* (De Anatomicis Administrationibus). Hubaysh translated it under the supervision of Hunayn.[73]

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[73] Ibn an-Nadim (who died in 995 A.D.) saw a translation of Galen's *Large Anatomy* from the hand of Hubaysh. Bergsträsser who studied the grammar and style of the text agrees with Ibn an-Nadim, but he found many corrections that bore the style of Hunayn. Hunayn in his *risala* fails to mention who translated this work into Arabic. It seems now established that it was translated into Arabic by Hubaysh with the aid of Hunayn. The original Greek text was lost

(71) Galen's book about *The Dissension Regarding Anatomy Prior to his Time* (De Anatomica Dissensione). Translated into Syriac by Hunayn.

(72) Galen's book *The Dissection of the Dead* [Animals] (De Anatome Mortuorum). Hunayn translated it into Syriac.

(73) Galen's book on *The Dissection of the Living* [Animals] (De Vivorum Anatome). Translated into Syriac by Hunayn.

(74) Galen's book on *The Anatomical Knowledge of Hippocrates* (De Hippocratis Anatome). Translated into Syriac by Hunayn.

(75) Galen's book on *Erasistratos' Opinions on Anatomy* (De Erasistrati Anatome). Translated into Syriac probably by Hunayn.

(76) Galen's book on *Anatomy of the Uterus* (De Uteri Dissectione). Translated into Syriac by Hunayn.

(77) Galen's book on *The Difference of, in themselves, Homogeneous Body Parts.* Probably translated into Syriac by Hunayn.

(78) Galen's book *Anatomy of the Organs of Voice* (Vocalium Instrumentorum Dissectio). Translated into Syriac by Hunayn. Hunayn doubts the authorship of Galen.

(79) Galen's book on *Anatomy of the Eye* (De Anatomia Oculorum). Hunayn made an extract of same; however he doubts the authorship of Galen.

(80) Galen's book on *The Causes of Respiration* (De Causis Respirationis). Hunayn corrected the already existing Syriac and Arabic versions.

(81) Galen's book on *The Voice* (De Voce et Anhelitu). Hunayn translated it into Arabic.

(82) Galen's book on *The Movement of the Muscles* (De Motu Musculorum). Translated into Syriac by Hunayn.

(83) Galen's book on *The Need for Pulse* [Use] (De Usu Pulsuum). Translated into Syriac by Hunayn.

(84) Galen's book on *Need for Respiration* (De Respirationis Usu). Hunayn translated the whole into Syriac and made an incomplete Arabic version.

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and we only know this work of Galen's through the Arabic translation. Two manuscripts are extant; one at Oxford and the other at the London Royal College of Physicians. Simon has edited the second half of this work (1906) under the title *Sieben* Bücher Anatomie des Galen. Leipzig, 1906, 2 vols. Bergsträsser criticizes Simon's edition in places because of his unnecessary alteration of the text. He wished that Simon had collaborated with an Arabist.

Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), p. 403.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 20.

Bergsträsser, G., Hunain ibn Ishak und seine Schule, (Leiden, 1913), p. 29 & 51.

(85) Galen's book on *The Arteries* and *Whether* or not the *Blood* in them *flows* by *Nature* (An in Arteriis Natura Sanguis Contineatur). Translated into Syriac by Hunayn.

(86) Galen's book on *The Forces of Purgative Medicine* (De Purgantium Medicamentorum Facultate). Hunayn translated it into Syriac.

(87) Galen's book on *Habits* (De Consuetudine). Translated into Syriac by Hunayn.

(88) Galen's book on *The Opinions of Hippocrates and Plato* (De Placitis Hippocratis et Platonis). Translated into Syriac by Hunayn.

(89) Galen's book on *The Difficult and Obscure Movements* (De Motibus Manifestis et Obscuris). Translated into Syriac and Arabic by Hunayn.

(90) Galen's book on *The Organ of Smell* (De Instrumento Odoratus). Translated into Syriac by Hunayn.

(91) Galen's book on *Uses of the Body Parts* (De Usu Partium Corporis Humani). Hunayn translated it into Syriac and corrected and completed an Arabic version.

(92) Galen's book on *The Best Conformations of the Body* (De Optima Corporis Nostri Constitutione). Hunayn translated it into Syriac and Arabic.

(93) Galen's book on *The State of Well Being of the Body* (De Bono Habitu). Translated into Syriac by Hunayn.

(94) Galen's book on *Unequal Bad Temperaments* (De Inaequali Intemperie). Translated into Arabic by Hunayn.

(95) Galen's book on *Simple Remedies* (De Simplicium Medicamentorum Temperamentis et Facultatibus). Translated into Syriac by Hunayn.

(96) Galen's book on *The Phases of Diseases* (Four periods) (De Morborum Temporibus). Translated into Syriac by Hunayn.

(97) Galen's book on *Plethora* (De Plenitudine). Translated into Syriac by Hunayn.

(98) Galen's book on *Tumors* (De Tumoribus praeter Naturam). Hunayn made an outline in Syriac of same.

(99) Galen's book on *Tremor, Palpitation, Rigor and Convulsions* (De Tremore, Palpitatione, Rigore et Convulsione). Translated into Syriac by Hunayn.

(100) Galen's book *The Divisions of Medicine* (De Partibus Artis Medicae). Translated into Syriac wholly and partially into Arabic. Hunayn doubts the authorship of Galen.

(101) Galen's book *The Semen* (De Semine). Translated into both Syriac and Arabic by Hunayn.

(102) Galen's book on *The Delivery of Embryo* (Born at Seven Months) (De Septimestri Partu). Translated into both Syriac and Arabic by Hunayn.

(103) Galen's book on *Black Bile* (De Atra Bile). Arabic version abridged by Hunayn.

(104) Galen's book on the *Cycles of Fever* (Adversus Eos qui de Typis scripserunt). Translated into Syriac by Hunayn.

(105) Galen's book *Dyspnea* (De Difficultate Respirationis). Translated into Arabic by Hunayn; and he also corrected a Syriac version.

(106) Galen's book on *Characteristics of Prognosis* (De Praenotione). Translated into Syriac by Hunayn.

(107) Galen's book on *Venesection* (Contradicting Erasistratos) (De Venaesectione adversus Erasistratum). Translated into Syriac by Hunayn.

(108) Galen's book on *Marasmus* (De Marcore). Hunayn made a summary of the book in Syriac and probably translated the whole into Syriac.

(109) Galen's book on *Properties of Nutriment* (De Alimentorum Facultatibus). Hunayn translated and made a summary of the book in both Syriac and Arabic.

(110) Galen's book on *Attentuating Regimen* (De Attenuante Victus Ratione). Translated into Arabic and Syriac by Hunayn who also made a Syriac summary.

(111) Galen's book on *The Good and Bad Chyme* (De Probis Pravisque Alimentorum Succis). Translated into Syriac by Hunayn.

(112) Galen's book on *Management of Acute Diseases According to Hippocrates* (De Diaeta Acutorum (Morborum) Secundum Hippocratem). Translated into Arabic and Syriac by Hunayn.

(113) Galen's book on *Composition of Remedies* (De Compositione Medicamentorum secundum Genera secundum Locos). Translated into Syriac by Hunayn.

(114) Galen's book *The Remedies of Corresponding Diseases* (De Antidotis). Hunayn helped to translate it into Syriac.

(115) Galen's book on *Antidote to Pamphylianos* (De Theriaca ad Pamphilianum). Translated into Syriac by Hunayn.

(116) Galen's book *The Methods to Preserve Health* (De Tuenda Sanitate). Hunayn translated it into Syriac.

(117) Galen's book to *Thrasybulos* (Ad Thrasybulum). Hunayn translated it into Syriac.

(118) Galen's book on *Gymnastics with the Small Ball* (De Parvae Pilae Exercitio). Translated into Syriac by Hunayn.

(119) Galen's *Commentaries on the Hippocratic Oath* (In Hippocratis Jusjurandum Commentarius). Hunayn translated it into Syriac.

(120) Galen's *Commentaries* on *Hippocrates' Aphorisms* (In Hippocratis Aphorismos Commentarii). Hunayn translated it into Arabic and corrected an old Syriac version.

(121) Galen's *Commentaries on Hippocrates'* book on *Fractures* (In Hippocratis Librum De Fracturis Comm.). Hunayn translated same into Syriac.

(122) Galen's *Commentaries on Hippocrates' book on Reduction of Dislocations* (In Hippocratis Librum De Articulis Comm.). Translated into Syriac by Hunayn.

(123) Galen's *Commentaries on Hippocrates' Prognostics* (In Hippocratis Prognosticon Commentarii). Hunayn translated same into Syriac.

(124) Galen's *Commentaries* on *Hippocrates'* book on *Management* of *Acute Diseases* (In Hippocratis De Diaeta Acutorum Libros Comm.). Hunayn translated it into Syriac.

(125) Galen's *Commentaries* on *Hippocrates'* book on *Ulcers* (In Hippocratis De Ulceribus Librum Comm.). Translated into Syriac by Hunayn.

(126) Galen's *Commentaries* on *Hippocrates'* book *Wounds* of the *Head* (In Hippocratis De Capitis Vulneribus Librum Comment.). Translated into Syriac by Hunayn.

(127) Galen's *Commentaries* on *Hippocrates'* book *Epidemic* (In Hippocratis De Morbis Popularibus Libr. Comm.). Translated by Hunayn, part into Arabic and into Syriac.

(128) Galen's *Commentaries* on *Hippocrates'* book on *Humors* (In Hippocratis De Humoribus Libr. Comm.). Hunayn translated it into Syriac.

(129) Galen's *Commentaries* on *Hippocrates' Physician's Office Manual* (In Hippocratis De Officina Medici Comment.). Hunayn translated and summarized it in Syriac.

(130) Galen's *Commentaries* on *Hippocrates' Book* on *Nutrition* (In Hippocratis De Alimento Libr. Comm.). Hunayn translated it into Syriac.

(131) Galen's *Commentaries* on *Hippocrates' Book Human Nature* (In Hippocratis De Natura Humana Libr. Comm.). Translated and summarized in Syriac by Hunayn.

(132) Galen's book on *An Excellent Physician Should* be a *Philosopher* (Quod Optimus Medicus sit quoque Philosophus). Translated into Syriac and Arabic by Hunayn.

(133) Galen's book on *True* and *False* books of *Hippocrates* (De Genuinis Scriptis Hippocratis). Translated and summarized in Syriac by Hunayn.

(134) Galen's book on *The Soul According* to *Asclepiades* (De Substantia Animae secundum Asclepiadem). Translated into Syriac by Hunayn.

(135) Galen's book on *The Experience* in *Medicine* (De Experientia Medica). Hunayn translated it into Syriac.

(136) Galen's book on *Urging* the *Study* of *Medicine* (Oratio Suasoria ad Artes). Hunayn translated it into Syriac.

(137) Galen's book on *The Trials* of the *Best* of *Physicians*. Translated into Syriac and Arabic by Hunayn.

(138) Galen's book on *His Opinions* (What one knows and what one does not know) (De Propriis Placitis). Translated into Syriac by Hunayn.

(139) Galen's book on *Medical Nomenclature* (De Nominibus medicinalibus). Hunayn translated parts of it into Syriac.

MISCELLANEOUS MEDICAL TRANSLATIONS

(140) Rufus' book on *Hygiene.*[73]
(141) Rendition of *Paul* of *Aegina Pandectes.*[74]
(142) Oribasius' *Book* to *His Son, Eustathe.* (Nine treatises.)[75]
(143) Oribasius' *Book* to *His Father, Eunapius.* (Four treatises.)[76]
(144) Oribasius' large collection of *Seventy Treatises.*[77]
(145) Dioscorides' book on *Plants.* (Five treatises.)[78]
(146) Soranos' book on *Enema.* The translation was revised by Hunayn.[79]
(147) Pelops and Soranos' Commentaries on Hippocrates' book *The Nature* of the *Embryo* (In Hippocratis De Foetus Natura Libr. Comm.). Translated into Arabic by Hunayn.[80]
(148) Theomnestus' *Veterinary Medicine* and *Surgery.*[81]

III. HUNAYN'S ORIGINAL NON-MEDICAL WORKS

(149) Book on *Logic.*[82]
(150) A Book on *What* to be *Read Before Reading Platon.*[83]

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[73] Usaybi'a credits Hunayn with a commentary on Rufus' book on *Hygiene.* Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

[74] Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), p. 407.

[75] *Ibid.*

[76] *Ibid.*

[77] *Ibid.*

[78] Al-Fihrist ascribes the translation of this work to either Hunayn or Hubaysh. Manuscript is extant at Aya Sofia (mosque) in Istanbul.

Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), p. 408.

Cheikho, Louis, Catalogue des Manuscrits des Auteurs Arabes Chrétiens depuis L'Islam, Imprimerie Catholique, (Beyrouth, Syria, 1924), p. 93.

[79] Translated by Eustathe and revised by Hunayn. Ibid., p. 408.

[80] Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 44.

[81] Not mentioned by Al-Fihrist, Ibn al Qifti or Usaybi'a. According to Le Clerc, manuscript of this work is extant at Paris, No. 1038 Ancien Fonds.

Le Clerc, Lucien, Histoire de la Medécine Arabe, (Paris, 1876) Vol. 1, p. 150.

[82] Usaybi'a mentions another work entitled *Questions Extracted* from the *Four Books* on *Logic.* Here he may be referring to Hunayn's translation of Aristotle's *Organon.* There is no mention made by Al-Fihrist or Al-Qifti of this work.

Ibn Abi Usaybi'a, Uyun-al-a'nba Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

[83] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

(151) Questions prepared as An Introduction to *Phorphyry's Isagoge.*[84]
(152) *Book* on *Categories* according to *Themistius.* (One essay.)[85]
(153) *Book* on the *Creation* of *Man Purporting* to *Prove* that *His Dependence Is Beneficial* and *Obligatory.*[86]
(154) *Book* on *Anecdotes Concerning Ancient Philosophers* and *Medical Men.*[87]
(155) *Book* on *Actions* of the *Sun* and *Moon.*[88]
(156) Book on *The Tides.*[89]
(157) Treatise on *The Rainbow.*[90]
(158) Treatise on *Why* the *Sea Water* is *Salty.*[91]
(159) Book on *Properties* of *Stones.*[92]
(160) Treatise on *Generation* of *Fire* between *Two Stones.*[93]
(161) Questions on *The Arabic Language.*[94]
(162) Book on *Cosmetics.*[95]
(163) Commentaries on Aristotle's *Physiognomy.*[96]
(164) *Risala* on the *Adversities* that had *Befallen His Life.*[97]

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[84] To read Usaybi'a's account of this book in the list, one is led at first glance, to infer that he had himself written a preface to it expounding the text. It is very likely a mere translation of *Phorphyry's Isagoge* as quoted by Le Clerc. Employing the word *questions* one time and *fruit* on some other occasion, Usaybi'a misleads the student to think that Hunayn contributed something to the translation himself. Aside from this neither the Fihrist nor Al Qifti made any mention of this work.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

[85] Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), p. 410.

[86] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

[87] Manuscript is extant at Munich (651).

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

Cheikho, Louis, Catalogue des Manuscrits des Auteurs Arabes Chrétiens depuis L'Islam, Imprimerie Catholique, (Beyrout, Syria, 1924), p. 93.

[88] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

[89] *Ibid.*

[90] *Ibid.*, p. 200.

[91] *Ibid.*

[92] *Ibid.*

[93] *Ibid.*

[94] *Ibid.*

[95] *Ibid.*

[96] *Ibid.*

[97] *Ibid.*

(165) Book on *Advantages.*[98]

(166) History of the World beginning from Adam, the kings of Israel, Greece and Rome, the advent of Islam, the Umayyed Dynasty and the Abassid until his own time under the Caliph al-Mutawakkil.[99]

(167) *Risala* that *Fate Denotes Monotheism.*[100]

(168) Book as a *Reply* to *Ali ibn Yakya's* letter in which he asked him (Hunayn) to adopt Islam.[101]

(169) Book on *Meteorology.*[102]

(170) Book on *How* to *Understand Religion.*[103]

(171) Book on *Syntax*, according to the Greek style.[104]

(172) Greek Syriac *Dictionary.*[105]

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[98] *Ibid.*

[99] *Ibid.*

[100] *Ibid.*

[101] *Ibid.*

[102] The literal translation of this work is *Celestial Signs.* Usaybi'a credits Hunayn with another work entitled Book on *Colors* which according to Meyerhof may be a section of his treatises on *Ophthalmology.*

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

Meyerhof, Max, Ten Treatises on the Eye Ascribed to Hunain ibn Is-haq, (Cairo, Egypt, 1928), p. 32.

[103] Here Usaybi'a commits the error of repetition, for at the end of the list he mentions another book entitled almost the same: "Understanding the Reality of Religion", or "How Religious Truth can be Recognized", manuscript of which is extant in the Jesuit Library of Beirut, Syria. It had been edited by Father Louis Cheikho This edition in Bergsträsser's opinion is not free from errors.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan (Cairo, Egypt, 1882), Vol. 1, p. 200.

Cheikho, Louis, Catalogue des Manuscrits des Auteurs Arabes Chrétiens depuis L'Islam, Imprimerie Catholique, (Beyrout, Syria, 1924), p. 93.

Bergsträsser, G., Hunain ibn Ishak und seine Schule, (Leiden, 1913), p. 10.

[104] Aside from his books on *Syntax* according to the Greek style and on Arabic grammar, Usaybi'a mentions another book on *Syntax* which in the opinion of the writer may be either implied in one of the two forementioned works, or a repetition of either one of them. Sarton mentioned a book on Syriac grammar entitled *Diacritical* which deals partly with syntax.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

Sarton, George, Introduction to History of Science, (Baltimore, 1927), Vol. 1, p. 611.

[105] Baumstark quoted by Meyerhof.

Meyerhof, Max, Ten Treatises on the Eye Ascribed to Hunain Ibn Is-haq, (Cairo, Egypt, 1928), p. 27.

(173) Treatise on *Synonyms*.[106]
(174) Book on *Agriculture*.[107]

IV. HUNAYN'S ORIGINAL MEDICAL WORKS

(175) The *Questions* (on medicine) elementary treatise arranged in the form of questions and answers, as an introduction to general medicine. This book which was not completed by Hunayn was finished later by Hubaysh. It was widely commented upon by Arab physicians of later centuries.[108]
(176) *Introduction* to *Galen's "Ars Parva"* (Isagoge Johanniti ad Tegni Galeni).[109]
(177) A treatise on *Symptoms* of *Diseases*.[110]
(178) Book on *Anatomy* of the *Alimentary Apparatus*.[111]

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[106] Sarton, George, Introduction to History of Science, (Baltimore, 1927), Vol. 1, p. 611.

[107] Three duplicate manuscripts of a work on *Agriculture* are in the British Museum and the Berlin Library. Several Orientalists have ascribed it to Ibn Wahshiyya. Al-tabari who wrote his Paradise of Wisdom in 850 A.D. incorporated verbatim many parts of this manuscript in his own work, but it is improbable that Ibn Wahshiyya is its author as he wrote his book on *Agriculture* in 904 A.D. May it not be possible that the unknown author is Hunayn, since the latter was the contemporary of al-Tabari? It would be worth while for an Orientalist to compare the style of this manuscript with that of Hunayn's known works.

Siddiqi, M.Z., Firdausu'l-Hikmat, (Berlin, 1928), p. 17–18.

[108] Manuscripts are extant in Berlin (Alwardt 6258) in Bodl. (I–594 et 636) and in Jesuit Library of Beirut, (Syria).

Cheikho, Louis, Catalogue des Manuscrits, des Auteurs Arabes Chrétiens depuis L'Islam, Imprimerie Catholique, (Beyrout, Syria, 1924), p. 93.

[109] Manuscript extant in Escurial Library 848 and in Vatican Library, 348. Cheikho, Louis, Catalogue des Manuscrits, des Auteurs Arabes Chrétiens depuis L'Islam, Imprimerie Catholique, (Beyrout, Syria, 1924), p. 93.

[110] The literal translation of this work as given by Usaybi'a is *"A Treatise* on *Symptoms* which describes a group of symptoms that indicates each one of the diseases." This work is neither mentioned by Al-Fihrist or Al-Qifti.

It seems to the writer of these lines that it may be either identical with, or a part of Galen's work *"Recognition* of *Diseases* of the *Inner Body"* as enumerated in in his *risala* on Galen's works.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 197.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 12.

[111] Al-Fihrist and Al-Qifti entitle this work *Alimentary Apparatus*. Usaybi'a adds the word *Anatomy* which goes to make the title *Anatomy* of *Alimentary Ap-*

(179) Book on *Stomach Diseases* and *Its Treatment*.[112]
(180) Book on *Ulcer* and *Its Cause*.[113]
(181) Book on *Fevers*.[114]
(182) Book on *Pulse*.[115]
(183) A treatise on *Epilepsy*.[116]
(184) Treatise on *Dyspnoea*.[117]
(185) Comment on the *Organs* of *Pain*. (He clarifies Gessios of Alexandria's doubts on Galen's book *Organs* of *Pain*.[118]
(186) Book on *Care* of *Atrabilious Persons*.[119]
(187) Book on *Functions* of *Organs*.[120]

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paratus. Hunayn's *risala* contains no separate work by Galen under this title but this work may correspond with the sixth treatise of Galen's *Large Anatomy*.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), Vol. 1, p. 410.

Ibn al Qifti, Tarikhu'l-Hukama, Arabic Edition, Saada Press, (Cairo, Egypt, 1326 A.H.), p. 119.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 19.

[112] Manuscript No. 847 is extant in the Escurial Library.

Cheikho, Louis, Catalogue des Manuscrits, des Auteurs Arabes Chrétiens depuis L'Islam, Imprimerie Catholique, (Beyrout, Syria, 1924), p. 93.

[113] This work is entitled *Book* on *Ulcer* and Its *Genesis* (cause) which is agreed upon by both Al-Fihrist and Al-Qifti but it is not mentioned by Usaybi'a.

Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), Vol. 1, p. 410.

Ibn Al Qifti's Tarikhu'l-Hukama, Arabic Edition, Saada Press, (Cairo, Egypt, 1326 A.H.), p. 120.

[114] Usaybi'a mentions this work among Hunayn's original works but Fihrist and Al-Qifti failed to make any mention of it.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

[115] *Ibid.*

[116] *Ibid.*, p. 200.

[117] *Ibid.*

[118] A manuscript dated 420 A.H. at the library of Georgius Bey Safa of Syria. Cheikho, Louis, Catalogue des Manuscrits, des Auteurs Arabes Chrétiens depuis L'Islam, Imprimerie Catholique, (Beyrouth, Syria, 1924), p. 93.

[119] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

[120] The literal translation of this title would be *The Conditions* (or *States*) of the *Organs*. Hunayn's *risala* mentioned a translation of a work entitled *Uses* of

(188) Book on *Dryness*.[121]
(189) Book on *Urine*.[122]
(190) Treatise on *Calculus*.[123]
(191) Book naming *Simple Drugs* arranged alphabetically.[124]
(192) Book on *Properties* (secrets) of *Compound Medicines*.[125]
(193) Book on the *Selection* of *Caustic Medicine*.[126]

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the *Body Parts*. The similarity of the titles is noteworthy. Usaybi'a later mentions one other work entitled *Book* on *Naming* the *Organs According* to *Galen's* classification which work may be his translation of Galen's work *Medical Nomenclature*, mention of which is already in this work.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 27 and p. 47.

[121] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan (Cairo, Egypt, 1882), Vol. 1, p. 199.

[122] Usaybi'a mentions a work entitled *Questions* on *Urine* which Hunayn translated from Hippocrates' *Epidemic*. As he proceeds he gives another with slight variation, namely Book on *Urine* translated from Hippocrates and Galen's works.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

[123] The literal translation of the title as given by Usaybi'a is Treatise on the *Genesis* (formation) of *Calculus*.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

[124] This work is only mentioned by Usaybi'a. Farther on Usaybi'a mentions another work entitled *Commentaries* on *Hidden Drug* by Galen explaining the property of each one. These two books may be identical. The first title is similar to Galen's *Simple Drugs* mentioned in the *risala*.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199 and p. 200.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 29 and p. 30.

[125] Usaybi'a mentions below another work entitled Treatise on *Compounding* (medicine?) in which he was in agreement with Hippocrates and Galen the Excellent. Those two books might be nothing but the *Composition* of *Remedies* which is translated by Hunayn and mentioned in his *risala*.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199 and p. 200.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 36.

[126] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

(194) Book on *Theriac*.[127]
(195) A book as a reply to Al-Mu'tamid about the *Differences between Nutriment and Laxatives*.[128]
(196) A *risala* on *Tablet of Roses*, prepared for at-Taifuri.[129]
(197) A *risala* on the *Tablet of Aloes*. (Agalloche).[130]
(198) A treatise on the *Decoction of Légume*.[131]
(199) The Syriac book of *Medicines*.[132]
(200) Book on the *Diet of Old Men*. (Written in Syriac.)[133]
(201) Treatise on *Hygiene*.[134]
(202) Book on *How to Prevent the Harm of Nutriment*.[135]

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[127] Both Usaybi'a and the Fihrist ascribe to Hunayn a book consisting of two treatises on *Theriac*. Hunayn in his *risala* mentions two translations on the same subject. The first, Hunayn was in doubt whether he translated in his early youth; the second work was given a syriac rendition by Ayyub and he thought that Yahya Ibn Al-Bitriq rendered it into Arabic.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo Egypt, 1882), Vol. 1, p. 198.

Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), p. 410.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 38 and p. 39.

[128] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

[129] *Ibid.*, p. 199.

[130] *Ibid.*

[131] *Ibid.*

[132] Hunayn's authorship is doubtful.

Budge, E. A. Wallis, The Syriac Book of Medicine, Oxford University Press, 1913, 2 vols.

[133] Baumstark quoted from Meyerhof, Max, Ten Treatises on the Eye Ascribed to Hunain ibn Is-haq (809–877 A.D.), (Cairo, Egypt, 1928), p. 27.

[134] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

[135] Besides the above mentioned book on *Diet*, Usaybi'a credits Hunayn with the following works dealing with the same subject: *Properties* of *Nutriment*, the *Properties* of *Nutriment* and *Care* of *Bodies*, *Book* on the *Dietetic Care* of the *Healthy* (*normal*). The first title is identical with the title of his Galenic translation on the subject which Hunayn summarized adding to it several treatises written by old masters on the subject. The similarity of the titles leads the student to suspect either errors in transcription or repetition.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 198–200.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 35.

(203) Book on the *Preservation of Teeth.*[136]
(204) Book on *Milk.*[137]
(205) Book on the *Care of the Dropsical.*[138]
(206) Treatise on the *Care of Convalescents.*[139]
(207) Treatise on *Bath.*[140]
(208) Book on *Thermal Bath.*[141]
(209) A risala as a reply to Salmawaih ibn Bunan answering his question as to what Galen had written about *Habits.*[142]
(210) Book on the *Philosopher's Secrets* in *Coition.*[143]
(211) Treatise on *Titilation.*[144]
(212) Treatise on *Genesis* of the *Chick* purporting to show that the chick generates from the white and feeds on the yolk.[145]
(213) Treatise on *Longevity.*[146]
(214) Book on the *Difference of Flavors.*[147]
(215) Book on *Examination of Physicians.*[148]

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[136] Usaybi'a mentioned below a book on the *Preservation* of *Teeth* and *Gums* which seems under all probabilities to be identical with this work *Preservation* of the *Teeth.*

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

[137] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

[138] *Ibid.*

[139] *Ibid.*

[140] *Ibid.*, p. 200.

[141] Al-Fihrist and Al Qifti make no mention of this work. Le Clerc renders it as L'eaux Pestillances.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris, 1876), Vol. 1, p. 152.

[142] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 200.

[143] Al-Fihrist gives the title of this work as book on *Coition.*

Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), Vol. 1, p. 410.

[144] Al-Fihrist and Al-Qifti make no mention of this work. Manuscript is extant in the Escurial Library.

Le Clerc, Lucien, Histoire de la Médecine Arabe, (Paris 1876), Vol. 1, p. 152.

[145] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

[146] *Ibid.*, p. 200.

[147] *Ibid.*

[148] *Ibid.*, p. 199.

(216) Treatise as an *Apology to Galen* for what he had written in the seventh article pertaining to the opinions of Hippocrates and Plato.[149]

(217) Book on *Birth* at *Eight Months*.[150]

(218) A *risala* from Hunayn to Ali ibn Yahya on all the books of *Galen* which have been translated and on some of them which have not been translated.[151]

(219) A treatise on the books written by *Galen* which were omitted in his index. In this treatise Hunayn had listed the authentic works that appeared after Galen might have had catalogued his previous works.[152]

(220) Book on *Veterinary Medicine*.[153]

(221) *Work* on *Ophthalmology*. (Ten Treatises.)

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[149] *Ibid.*, p. 198.

[150] Historians are in disagreement as to the title of this work. Al Qifti entitles it *Birth* at *Six Months* written for al-Mutawakkil's mother. The Fihrist gives it as *Birth* at *Eight Months* written for al-Mutawakkil's son's mother. Usaybi'a mentioned further a treatise entitled *Selections* from the *Sayings* of *Galen* and *Hippocrates* on the *Genesis* of *Embryo*. He also credits Hunayn with the translation of Hippocrates' text entitled *Birth* at *Eight Months*. Aside from the forementioned work Hunayn himself stated in his *risala* that he translated Galen's work into Syriac and Arabic entitled *The Delivery* of *Embryo Born* at *Seven Months*.

Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-al Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 199.

Ibn al Qifti, Tarikhu'l-Hukama, Arabic Edition, Saada Press, (Cairo, Egypt, 1326 A.H.), p. 119.

Fihrist, Arabic Edition by Mustafa Muhammad, (Cairo, Egypt, 1348 A.H.), Vol. 1, p. 410.

Bergsträsser, G., Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen, (Leipzig, 1925), p. 32.

[151] Manuscript of this work is preserved in Aya Sofia (Mosque) Library in Istanbul, No. 3631, and has been edited and translated into German by Bergsträsser, under the title *Hunain ibn Ishaq über die syrischen und arabischen Galen-Übersetzungen*, (Leipzig, 1925). A detailed account of this *risala* has already been given in this work (see p. 10–14).

[152] Manuscript of this treatise is extant in Aya Sofia (Mosque) Library in Istanbul.

Bergsträsser, G., Neue Materialien zu Hunain ibn Ishaq's Galen-Bibliographie, (Leipzig, 1932), p. 84.

[153] Said to be the first systematized textbook on veterinary medicine in the Arabic language.

Malouf, Issa, Iskandar, History of Arabic Medicine, second lecture delivered before the Academy of Damascus, Syria, Arabic Edition, (Damascus, 1925), p. 63.

It is not amiss to give space to the last mentioned work, that on Ophthalmology, because Hunayn was the first to chart a way for succeeding Aarbian contributors to the subject. More than thirty contributions in the Arabic language were made by later Arabian Ophthalmologists. Their works surpassed anything by Greeks and were authoritative until probably the beginning of the eighteenth century. Without any doubt the Arabs were the first to make a specialty of ophthalmology, and from the time of Hunayn, the term Al-Kahhal, which means ophthalmologist, was held in high esteem. In addition to the many extant treatises written by specialists we also find references by Arab historians to special Pavillions in the main Hospital of Damascus, Bagdad and Cairo, consecrated solely to the treatment of diseases of the eye. Ahmed Issa Bey in his *Histoire Des Bimaristans* (Hôpitaux) describes the various departments of these institutions. "Les deux sections étaient respectivement réparties à leur tour en plusieurs salles: une salle pour les maladies internes, une autre pour la chirurgie, une troisième pour l'ophthalmologie, et une quatrième pour l'orthopédie."[154]

Hunayn collected his material from the Greeks and therewith laid the foundation for Arabic ophthalmology. His *Ten Treatises* on the *Eye* is the first systematised text-book in Arabic literature. Hunayn wrote these treatises separately in the course of thirty years, as Usaybi'a tells us: "The existing copies of this book differ in style. Some are brief and some are unduly enlarged. The reason is that each treatise was written separately." In the last treatise Hunayn said, "During thirty years I composed different treatises on the eye in which I pursued different aims because I was asked to do so by different people. Finally I was asked by Hubaysh to compile these nine treatises in one book and to add a tenth as an epitome of what the ancients had written about the compound remedies for the eye."[155]

The researches of Professor Julius Hirschberg indicated that the *Ten Treatises on the Eye* (in Liber de Oculis Constantini Africani) preserved for us in Latin and attributed to Constantinus Africanus

[154] Issa Bey Ahmed, Histoire des Bimaristans (Hôpitaux) à l'époque islamique, Imprimerie Paul Barney, (Le Caire, Egypt, 1928), p. 84.

[155] Ibn Abi Usaybi'a, Uyun-al-a'nba, Arabic Edition by Imra-l-Quais-Tahhan, (Cairo, Egypt, 1882), Vol. 1, p. 198.

and Demetrius were really the *Ten Treatises* of Hunayn. Proof positive was established by Dr. Max Meyerhof in 1908 when he discovered in the private library of Ahmed Taimûr Pasha of Cairo, Egypt, an

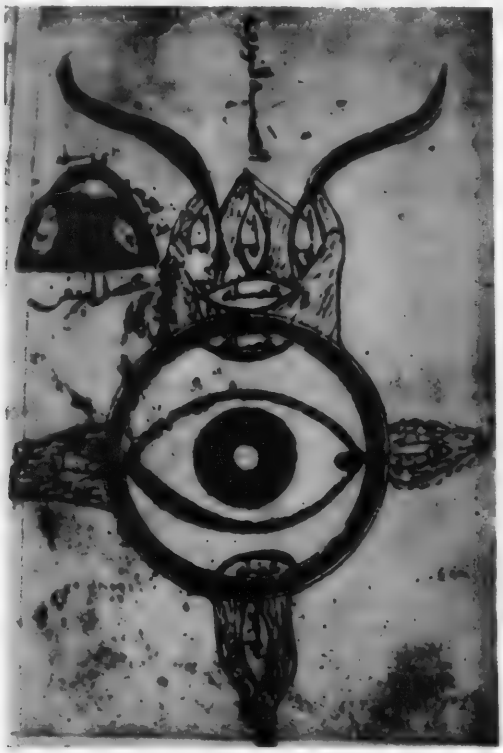


FIG. 3. THE THIRD OF THE EARLIEST KNOWN DIAGRAMS OF THE ANATOMY OF THE EYE SHOWING THE MUSCLES OF THE EYE

From the Arabic manuscript of Hunayn's Ten Treatises on the Eye, at the Taimûr Library Cairo, Egypt. Courtesy of Dr. Max Meyerhof.

original manuscript of Hunayn's *Ten Treatises on the Eye* with five anatomical diagrams. Unfortunately the end of the fifth, the whole of the sixth, and the beginning of the seventh were missing. Another

more complete manuscript of the *Ten Treatises* was mentioned by Professor I. Krachkovsky of Leningrad in his catalogue of the collection of Gregorius the Fourth, Patriarch of Antioch. Dr. Meyerhof obtained a copy of this still incomplete manuscript. To bridge the gap in the two manuscripts Dr. Meyerhof obtained a copy of the section on eye diseases from Ar-Razi's *Hawi* (*Continens*) which is found in the Escurial. This section contains quotations from Hunayn's *Ten Treatises*. A collation of these two manuscripts together with what he gleaned from Ar-Razi's quotations enabled Dr. Meyerhof to present Hunayn's *Ten Treatises* in its entirety. This he published in the original Arabic with an excellent English translation and glossary. The writer of this paper is wholly indebted to Dr. Meyerhof's research. Here are the subjects of the *Ten Treatises* as Meyerhof presents them:

1. The First Treatise deals with the nature of the eye and its structure.
2. The Second Treatise, with the nature of the brain and its use.
3. The Third Treatise, with the optic nerve, the visual spirit and the vision itself, how it is.
4. The Fourth Treatise, with the things which are indispensable to the conservation of health (and to the avoidance of its contrary).
5. The Fifth Treatise, with the cause of the accidents befalling the eye.
6. The Sixth Treatise, with the symptoms of the diseases occurring in the eye.
7. The Seventh Treatise, with the virtues (faculties) of all the remedies in general.
8. The Eighth Treatise, with the kinds of remedies particularly for the eye and their species.
9. The Ninth Treatise, with the medical treatment of eye-diseases.
10. The Tenth Treatise, with the compound remedies suitable for eye-diseases.

In addition to the *Ten Treatises* Usaybi'a found an eleventh annexed to this work, namely, The *Operative Treatment of Eye-Diseases*.

According to Usaybi'a the "*Questions* on the *Eye*" was compiled by Hunayn for his sons Da'-ud and Is-haq, but Dr. Meyerhof is inclined to attribute this book to one of Hunayn's pupils and informs us that it is merely an extract from the first six treatises of Hunayn, cast in the form of two hundred questions and answers, on the anatomy, physiology and pathology of the eye. This work Dr. Meyerhof hopes to publish in an European language at a later date.

Usaybi'a credits Hunayn with the works of *The Structure of the Eye, a Book* on *Colours*, *The Divisions of Eye Diseases*, *The Choice* of *Remedies* for *Eye Diseases*, and the *Operative Treatment* of *Eye Diseases;* but Dr. Meyerhof thinks they are single works written by Hunayn before they were collated into the *Ten Treatises.*

Much of what has been said here about Hunayn's work and its influence may be modified in the future when the thousands of hitherto unexamined manuscripts stored in mosques and private libraries of the East are made accessible. Many of his translations from the Greek are still to be found in the libraries of Istambul, and the writer is hopeful that the revival of scholarship now taking place in the Near East will bring much more to light on the subject of Arabic medicine.

The difficulties which at present confront an Orientalist are great. Many accounts given by Arab historians are diffuse, confused, and contain many irrelevant details. Often Usaybi'a, for example, confuses Hunayn's translations with his original work. Even the writer of this paper, who happens to be Hunayn's fellow countryman and able to read him in the original, has often to spend hours searching through encyclopedic Arabic works for the real meaning of an Arabic medical term, and often the same difficulty is met in the choice of an English word that will adequately and truly express the Arabic term. Therefore errors are unavoidable unless the student has access to original manuscripts, practically all of which are unobtainable in the United States. If this paper, which was written in the intervals of professional duties, only stimulates interest in further excursions into the history of Arabic medicine, the writer will find his reward.

The writer wishes to acknowledge his indebtedness to Dr. Henry E. Sigerist of Johns Hopkins and Dr. William S. Ladd of Cornell Universities for their valuable suggestions.

TEXTS AND DOCUMENTS

AN EXHIBIT ILLUSTRATING THE HISTORY OF PATHOLOGY

HELEN C. BROOKE

This exhibit originated, as did a similar one of a year ago on the history of anatomy, in a seminar course on the history of pathology. And so the central and basic section of the exhibit is devoted to what the students learned about the general developments of pathology and concepts of disease, in their best application to the endless need of the sick man.

It is concerned with the discoveries to which the modern procedure of clinical and pathological diagnosis owes its origin, most of them occurring within the last two hundred years. It would have been impossible to display, pictorially or bibliographically, in what space we had, the slow growth of disease conceptions which led to these discoveries, from the magical and religious explanations of the primitive, through the long-lived humoral pathology as expounded by the Greeks, to the cellular pathology of Virchow. But this development will be outlined briefly here, as an always necessary background for the better viewing of the modern scene.

For the primitive man, to whom little was clear beyond the need for food and occasional shelter, it was quite natural to conjure up demons and spirits as the promulgators of his illnesses, since he ascribed a spirit to everything with which he came in contact. And so, to the primitive man, disease was either the slow evanescence of the soul, due to bewitchment by some other person, or the presence of some superfluous element—a foreign body introduced by a demon, or the demon itself.

The Egyptian concept was a manifestation of the early period of empiric medicine, and though obviously magico-religious in some phases, was largely the result of practical observation of many typical cases, and of the natural conditions to which they were subjected.

The humoral pathology of the Greeks, which had its origin in the

PLATE I

natural philosophy of the pre-Socratic philosophers, and later became the guiding principle of medicine through Galen, originated in the contemplation of universal harmony and symmetry. To look upon good health as a state of perfect balance within the body was a combination of this natural philosophy, and of the Greek ideal of perfection in every manifestation of life, and in the creations of man. When a man was ill, his case was diagnosed according to which of the four humors might temporarily be in predominance—blood, phlegm, black bile, and yellow bile. They were also credited with the function of regulating a man's temperament. Then, once the humors became unbalanced, immediately the *vis medicatrix naturae*, or natural healing power of the body, would endeavor, with the aid of the physician and his diets, to restore the ideal balance, and a state of good health.

There were other theories concerning the cause of disease, in the ancient world, an interesting one being that of Themison and his followers—of three distinct pathological possibilities: the *status strictus*, *status laxus*, and *status mixtus* (a combination of the first two); conditions which could be dealt with in a simple and methodical way.

The theory of the humors was carried by the Greeks to Alexandria; from a conquered Alexandria, the faithfully observant Arab physicians transmitted it, augmented by their own copious observations, to the medical schools of the Middle Ages, and the Renaissance still found it, gallantly holding its own under the autocratic patronage of the 12-centuries-old Galen.

From this time on, the plot acquires complications. Gross anatomy, in the *Fabrica* of Vesalius (1543), did not teach men to look beyond the imagined humors for a cause of disease. And a theory so entrenched in tradition was a terrific hindrance to any scientific thinking. But far-sweeping and annihilating epidemics of plague and other diseases aroused the speculation of certain people, among them the Italian Fracastoro (*De contagionibus et contagiosis morbis et eorum curatione, libri tres*, 1546). There grew out of the need for relief a gradual recognition of the fact that a sort of *contagium*, emanating through the atmosphere, spread its baleful influence from one unfortunate to another. But if there existed at all any idea of a *contagium vivum*, it was purely hypothetical.

Yet still no concept of the organic aspects of disease, as we recognize

PLATE II

them today, was evident in medical literature. And the main fault of all diagnosis was the fact that the most outstanding symptom of a disease was invariably taken for the disease itself—hence the innumerable "fevers."

It is constantly before us, in studying any phase of world history, that when the cultural and receptive situation is ripe for the introduction of a discovery, then and then only can it be appreciated and put to its richest use. Often, then, has a man of thought and science stood on the threshold of a right conception, only to enter alone and forgotten, because his contemporaries were not philosophically or actively ready to follow.

The first possible realization of the true cause of disease was not the heaven-sent inspiration of one man. Naturally the greatly corrected idea of human anatomy gave a foundation for authoritative research. During the 16th and 17th centuries, much was to be discovered, though slowly and with many deviations, in the field of chemistry and physics and the natural sciences. But as yet, there were tremendous gaps in the conception of disease. In an effort to explain everything, to provide an unbroken chain of cause and effect, out of the sober mechanistic physiology of Harvey grew the busy and enthusiastic Iatrophysicists. The 16th century natural philosopher, Paracelsus, years ahead of his time, had endeavored to create a new conception of disease. His scientific experience was beyond that of his contemporaries. Like the Greeks, he saw man in his relation to the whole universe, but his realization of the significance of the chemical and physical sciences could not be appreciated until the sudden outburst of theory and experiment of certain chemists and physiologists of the 18th century. From Paracelsus, the Iatrochemists took their lead, with much the same desire to explain everything as the Iatrophysicists. Yet, because the practice of medicine had fallen so far behind the science of medicine, their theories found no active expression, and became mere hypotheses.

During the 18th century there arose an interest in the classification of plants and animals, and it was natural that physicians should transmit this enthusiasm into the realm of disease. But to classify all things under one leading principle and heading was quite impossible. And, too, so few diseases were actually recognizable as distinct entities that the attempts must necessarily be abortive.

And now to the rise of pathological anatomy. For many centuries after dissection of the human body was first practiced, legally or illegally, bodies of criminals were almost the only accessible objects of dissection. Many of them were young and healthy. Occasionally there were obvious abnormal conditions, such as gallstones, which excited speculative interest, and which were recognized as the result of organic diseases; but gross anatomy continued to be normal anatomy. Without knowing the normal function of an organ, a thing which was scarcely possible before the physiology of the 17th century, it was not likely that pathological differences in organs would appear to the observers as changes due to disease.

Then, in 1761, in the 80th year of his life, was published the great rich book of Giovanni Battista Morgagni, an anatomist at the old University of Padua, already famed for the great medical men it had fathered. Morgagni was born seven years before Sydenham died, and his two huge volumes—*De sedibus et causis morborum per anatomen indagatis libri quinque*, Venetiis, 1761—packed with cases and observations, mostly in the form of letters to his colleagues, are a coördination of the observations of Sydenham's followers, and the rise of clinical medicine under Boerhaave, Van Swieten, and Haller. Thomas Sydenham, though a humoral pathologist, yet had a practical and humanitarian attitude towards disease, which was a reaction against the abstruse hypotheses of the Iatrophysicists and Iatrochemists. He "brought the doctors out of the laboratories into the sick-room"[1] and taught them how to observe the course of a disease in a patient from its first symptom to its disappearance, thus establishing diseases as recognizable entities. Morgagni had other predecessors. One of them was Theophilus Bonetus, primarily an avid and undiscriminating collector of odds and ends, like a great many people of the 17th and 18th centuries. (It was an age of collectors.) In 1679 he published a book entitled *Sepulchretum sive anatomica practica* (Geneva, 1762), which was a hodge-podge of unrelated observations on pathological anatomy as well as scattered objects of interest to an unparticular collector.

But anatomy had reached the point of development where it might be advanced into the domain of pathology. And in Morgagni's book,

[1] Henry E. Sigerist, *The Great Doctors*, New York, 1933, p. 181.

essentially a textbook of pathology, there is the fruit of all the centuries of groping, the realization of an organic pathology. He based his reports on findings from autopsies, correlating them with the whole clinical history of a patient, and he realized the extreme importance of minute changes. Often it can be seen that he was unable to differentiate between pathological changes before and after death, but this is due to the fact that some cadavers were kept under observation until there were marked after-death changes, the progress of which had not been noted by Morgagni and his students.

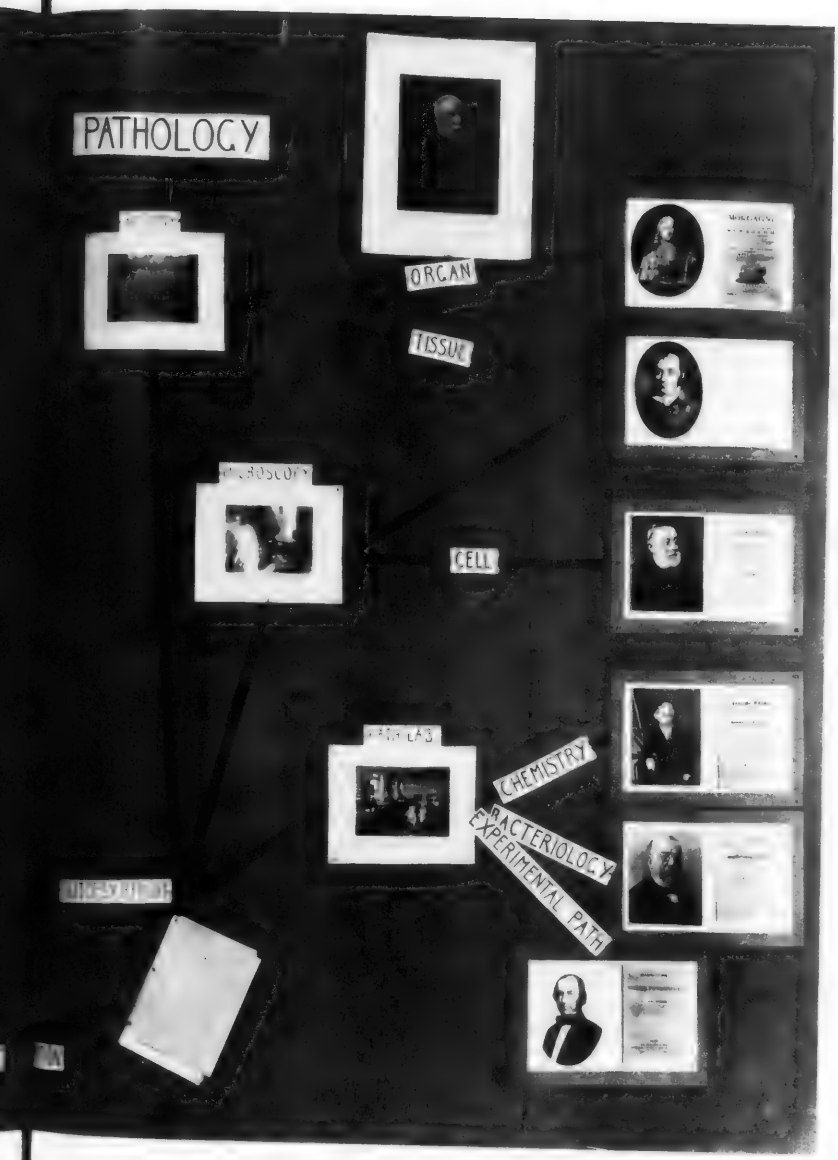
With Morgagni, the central section of our exhibit begins. For modern pathology is essentially a development from that unclassified but certainly sound pathology of Morgagni's. He could not of course conceive of the limitless individual forms one pathological condition can take. He used no microscope, and was unaware of microscopic changes in the tissues.

Since Morgagni, the upward trend in pathological anatomy, in diagnosis, and in the various fields of bacteriology and the chemical and physical sciences, has been a very sharp one. To show this constant rise, and its relation to modern clinical and pathological diagnosis, was our purpose in the arrangement of the central wall-section of our exhibit (see plate III and explanation). The central case is largely biographical and bibliographical, containing the chief books of pathological content, portraits of the men, and some of the most interesting and important textbooks and special monographs on pathology and bacteriology, from Vesalius to MacCallum.

For the rest, the other cases and wall-exhibits contain material on special fields—epidemic diseases, diseases of the heart, lungs and intestines, endocrine and urinary diseases, neurology, dermatology, and gynæcology—which have been dealt with in catalogue form, with short comments on the men and their contributions.

The study of the history of pathology, taking in as it does all the related fields of anatomy, chemistry, physiology and bacteriology, reflects in all its conceptions the philosophical and sociological aspects of the eras through which it has passed. To the student it presents a fascinating and continuous panorama of great thinkers and hard workers; and to the experienced scientist it becomes a controlling background for his own work, and a constant stimulus to his efforts.

MEDICINE
HISTORY
PERCUSSION
AUSCULTATION
X-RAY
CHEMISTRY
BLOOD
BACTERIOLOGY
METABOLISM


PATHOLOGY
ORGAN
TISSUE
CELL
CHEMISTRY
BACTERIOLOGY
EXPERIMENTAL PATH

THE PROCEDURE OF PATHOLOGY

Central Wall-Section

The idea of this central section is to illustrate chiefly how we have obtained our knowledge of disease, and how we are still working to increase and perhaps to complete that knowledge. What we know now is the result of the work of the clinician and the pathologist. The clinician, when he first meets the patient, takes the history. He then proceeds to a clinical examination, completing the process by laboratory examinations; and the literary result of his work is the case history. The pathologist, on the other hand, will start by performing an autopsy, will examine the organs microscopically in sections, will make laboratory experiments, and perhaps will find experimental material in the case. And the literary result of his work is the autopsy report. With these two documents in hand, by comparing them, checking up the symptoms observed while the patient was alive, with the findings of the pathologists, we are able to draw definite conclusions, to make a *synthesis*, and the knowledge thus gained will be the foundation for further research in the fields of cure and prevention. In this wall-section, we endeavor to trace some of the most important historical origins of the different steps in the procedure of both the clinician and the pathologist.

MEDICINE

Portrait of Sir William Osler, from the John Singer Sargent painting, "The Four Doctors."

Doctor and Patient: "The Visiting Doctor," from a painting by Gabriel Metsu.

History

Rufus of Ephesos: ἰατρικὰ ἐρωτήματα, (*Oeuvres de Rufus d'Ephèse*, by Charles Daremberg, Paris, 1879). The earliest known treatise on the questioning of the patient.

Clinical Examination: Snapshots of Sir William Osler from *The Life of Sir William Osler*, by Harvey Cushing, Oxford, 1925, vol. 1, p. 552.

Percussion

Leopold Auenbrugger (1722–1809): *Inventum novum ex percussione thoracis humani*, Vindobonae, Trattner, 1761. This book fulfilled the great need for a surer way of diagnosing internal disorders. Today, the doctor never finishes an examination without percussing the thoracic cavity, and his sureness is a tribute to Auenbrugger's ear for music, and the fact that when a small boy in his inkeeper-father's wine-cellar, he noticed that empty wine-barrels, when rapped, gave forth a resonant, high-pitched sound, and the full ones a dull, heavy sound. But it was not until his book was translated by Corvisart, more than forty years later (1808), that Auenbrugger's work was recognized for its real worth and importance.

Auscultation

René-Théophile-Hyacinthe Laennec (1781–1826): *Traité de l'auscultation médiate et des maladies des poumons et du coeur*, Paris, 1819, 2 vols.

Laennec, besides being the inventor of the stethoscope, was a brilliant clinician as well, and being tremendously interested in the welfare of his patients, was able to accomplish diagnostic wonders with his instrument, and to use his wide experience to the best therapeutic ends.

X-Ray

Wilhelm Conrad Röntgen (1845–1923): *Ueber eine neue Art von Strahlen*, Sitzungsber. d. phys.-med. Gesellsch. zu Würzb., 1893, 132–141. Little need be said of Röntgen and his contribution. The X-Ray is an indispensable factor in diagnosis and in the advancement of surgery, and is used for therapeutic purposes as well.

Clinical Laboratory (Picture by courtesy of the Surgeon-General's Library, Washington, D. C.)

Chemistry

Max von Pettenkofer (1818–1901): *Ueber eine neue Reaktion auf Galle und Zucker*, Ann. d. Chem. u. Pharm., Heidelb., 1844, lii, 90–96. Pettenkofer was a hygienist, and primarily interested in the experimental aspects of hygiene. His chemical studies, for which he is given this place in the exhibit, were largely directed towards an analysis of the effects of physical environment on the health of the people.

Blood

Gabriel Andral (1797–1876): *Essai d'hématologie pathologique*, Paris, 1843. Andral's work on the analysis of blood did much to establish the science of hæmatology as an independent pathological study.

Bacteriology

Robert Koch (1843–1910): *Die Aetiologie der Tuberkulose*, Berliner Klinische Wochenschrift, 1882, xxi, 221–230. Koch's contributions to the laboratory methods of scientific research are as striking and important as his work on the etiology of tuberculosis, cholera, anthrax, and wound infection. As a laboratory technician, he set a scientific precedent for the patient, methodical cultivation, study and final destruction of bacteria.

Metabolism

Santorio Santorio (1561–1636): *De statica medicina aphorismorum sectionibus septem comprehensa*, Venetiis, 1614. Although he did his work long before the rise of modern pathology, Santorio's simple but unassailable experiments in metabolism stamps him as the pioneer in that field. He was a humoral pathologist, and his experiment with scales and the measuring of his excreta were intended only to prove scientifically the humoral theories of Galen and Hippocrates. But such physiological research, founded on cold fact, and observation from hour to hour, was a sound contribution to clinical experimentation, and merits Santorio a place in the advancement of modern medicine.

CASE HISTORY (by the courtesy of the History Room of the Johns Hopkins hospital)

PATHOLOGY

Portrait of Dr. William H. Welch, from the John Singer Sargent painting, "The Four Doctors."

Autopsy (Picture by courtesy of the Surgeon-General's Library, Washington, D. C.)

Organ

Giovanni Battista Morgagni (1682–1771): *De sedibus et causis morborum, per anatomen indagatis libri V*, Venetiis, 1761. Little need be said further of Morgagni, except to point out his place in the general trend of pathology, as the exponent of organic pathology, followed by the tissue pathologist, Bichat.

Tissue

Xavier Bichat (1771–1802): *Traité des membranes en général, et de diverses membranes en particulier*, Paris, 1800 (An VIII). Bichat advanced Morgagni's work by pointing out that organs were made up of tissues, which were similar in different organs, thus explaining in a general way why disease symptoms in entirely different organs were generally identical. He used no microscope, and thus saw nothing of the finer cell-structure of the tissues. But his work, essentially physiological, gave an impetus and guiding principle to the researchers of the 19th century.

Microscopy (Picture by courtesy of the Surgeon-General's Library, Washington, D. C.)

Cell

Rudolf Virchow (1821–1902): *Die Cellularpathologie in ihrer Begründung auf physiologische und pathologische Gewebelehre* . . . Berlin, 1858. Virchow, in his presentation of the cell as the structural basis of the organs, pointed out that diseases had a life of their own, that a cell was the center of a kind of life, and was therefore a possible center of disease.

Pathological Laboratory (Picture by courtesy of the Surgeon-General's Library, Washington, D. C.)

Chemistry

Justus von Liebig (1803–1873): *Die organische Chemie in ihrer Anwendung auf Physiologie und Pathologie*, Braunschweig, 1842. The 19th century marked a tremendous advancement in the chemical and physical sciences, in their application to medicine as well as in their own particular fields. Liebig's university laboratory at Giessen was the first to be connected with such an institution, and his simple, hardworking method of teaching and research drew hundreds of enthusiastic students, who were later to spread his sound teachings through the laboratories and universities of Europe.

Bacteriology

Robert Koch (1843–1910): *Untersuchungen über die Aetiologie der Wund-infectionskrankheiten*, Leipzig, 1878.

Experimental Pathology

Claude Bernard (1813–1878): *Introduction à l'étude de la médecine experimentale*, Paris, 1865. Bernard's primary interest was in the physiology and chemistry of digestion, and in the rôle of the sympathetic nervous system in metabolic processes. He was schooled in the positivist movement that marked the breaking-away from Bichat and the vitalists. He was a strict experimentalist, and his discoveries, and the essence of his method, are a part of the physiological training of today.

AUTOPSY REPORT

The two procedures, clinical and pathological, end, respectively, in the case-history and the autopsy report, finally converging in the synthesis, or diagnosis of the case, and eventually in the cure and prevention of disease.

CENTRAL CASE (5)

Andreas Vesalius (1514–1564)

De humani corporis fabrica, Basiliae, 1543. The book that gave anatomy its first big advancement into modern times.

Joannes Schenck von Grafenberg (1530–1598)

παραδηρήσεων, sive observationum medicarum, rararum, novarum, admirabilium et monstrosarum . . . Francofurti, e typographeo . . . Hoffmani, 1609.

Theophilus Bonetus(1620–1689)

Sepulchretum sive anatomica practica . . . Genevae, sumptibus Chouët, 1762. A reflection of the 18th century spirit of collecting, containing some essentially sound pathological observations in numerous descriptions of cases and objects.

Giovanni Battista Morgagni (1682–1771)

De sedibus et causis morborum per anatomen indagatis libri quinque . . . Venetiis, 1762. (2nd ed.)

The seats and causes of diseases investigated by anatomy in five books . . . translated by Benjamin Alexander . . . 3 vols., London, 1769.

John Hunter (1728–1793)

Treatise on the blood, inflammation and gunshot wounds . . . London, 1794. This book, which gave the theory of inflammation some considerable advancement, showed inflammation to be not a disease, but a natural concomitant of disease, or even a cause of disease itself.

Works of John Hunter . . . edited by James F. Palmer, London, 1837. Plate XXIV, showing aneurysms of the aorta and carotid artery, an intussusception, and a bone disease.

A portrait of John Hunter, from the painting by Sir Joshua Reynolds.

XAVIER BICHAT (1771–1802)

Portrait, reprinted from a lithograph.

Recherches physiologiques sur la vie et la mort . . . Paris, 1800.

Traité des membranes en général et de diverses membranes en particulier, Paris, 1800.

LOUIS PASTEUR (1822–1895)

Print from a portrait made of Pasteur in his laboratory by A. Edelfelt.

Etudes sur la maladie des vers à soie . . . Paris, Gauthier Villars, 2 vols., 1870.

Etudes sur le vin, ses maladies . . . Paris, 1866.

CLAUDE BERNARD (1813–1878)

Leçons de pathologie experimentale . . . 2nd ed., Paris, Baillière, 1880.

Introduction à l'étude de la médecine experimentale, 5th ed., Paris, Librairie DelaGrave, 1930.

JULIUS COHNHEIM (1839–1884)

Neue Untersuchungen über die Entzündung, Berlin, 1873.

WILLIAM E. HORNER (1793–1853)

Treatise on pathological anatomy, Philadelphia, 1829. This was the first book of its kind written originally in the English language.

SAMUEL DAVID GROSS (1805–1884)

Elements of pathological anatomy . . . Boston, 1839, 2 vols.

RUDOLF VIRCHOW (1821–1902)

Cellularpathologie in ihrer Begründung auf physiologische und pathologische Gewebelehre . . . 2nd ed., Berlin, 1859.

Cellular pathology . . . translated by Frank Chance . . . New York, 1860.

Vorlesung über Pathologie . . . 2 vols., Berlin, 1863.

WILLIAM HENRY WELCH (1850–1934)

Surgical bacteriology . . . excerpted from *A System of Surgery*, edited by Frederick S. Dennis.

General bacteriology of surgical infections.

Papers and addresses by William H. Welch, 3 vols., Baltimore, Johns Hopkins Press, 1920.

Picture of Dr. Welch, lent by Mrs. Elizabeth T. Mayer.

WILLIAM G. MACCALLUM

A textbook of pathology, Philadelphia, W. B. Saunders, 1916.

EPIDEMIC DISEASES

Portraits

Edward Jenner (1749–1823)

Louis Pasteur (1822–1895)

Relapsing Fever

A map of the world, showing the epidemic, endemic and sporadic fever areas of the relapsing fever.

EPIDEMIC DISEASE

PLATE IV

PLATE V

Sleeping Sickness

A map of Africa, showing the epidemic and endemic areas, and also the locations manifesting the Gambian and Rhodesian forms of the disease.

Leprosy

Photograph of a painting by Orcagna, "The Triumph of Death," showing lepers ignored by Death, as they plead with him to release them from their suffering.

Group of lepers, showing different stages of the disease, from a painting by Nicolaus Emanuel Deutsch.

Cholera

Head of a man suffering from Cholera, from Robert Froriep's *Klinische Kupfertafeln*, Weimar, 1828–1837.

Plague

Diagram, from Vadianus, Basel, 1519, of a man, showing possible locations of buboes. (Sudhoff & Klebs, die ersten gedruckten Pestchriften . . . München, 1926, pl. XXIV.)

An interesting series of reproduced paintings and sculptures, showing the Christian saint of the Plague, St. Sebastian, in the various interpretations of his martyrdom.

Malaria

Four fever charts: single tertian fever (*ὁ τριταῖος πυρετός*), double tertian fever, single quartan fever (*ὁ τεταρταῖος πυρετός*), and double quartan fever.

MICROBES

Here are shown the first pictures (reproduced) of the most important pathogenic micro-organisms. All but one or two are from the original publications.

Malaria—1880—Alphonse Laveran: *Note sur un nouveau parasite trouvé dans le sang de plusieurs malades atteints de fièvre palustre*, Compt. rend. Acad. d. sc., Paris, 1880, xciii, 627.

Typhoid—1880—Carl Joseph Eberth and Georg Gaffky: *Die Organismen in den Organen bei Typhus abdominalis*, Arch. f. path. Anatomie, Berlin, 1880, lxxxi, 58–114.

Tuberculosis—1882—Robert Koch: *Die Aetiologie der Tuberkulose*, first published, without plates, in the Berliner Klinische Wochenschrift, 1882, xxi, 221–230. First pictures published in: Mitth. a. d. k. Gesundheitsamte, Berlin, 1884, ii, 1–88.

Glanders—1882—Friederich Loeffler: *Die Aetiologie der Rotzkrankheit*, Arb. a. d. k. Gesundheitsamte, Berlin, 1885–6, i, 141–198.

Cholera—1883—Robert Koch: *Ueber die Cholerabakterien*, Berlin, 1884.

Diphtheria—1884—Friedrich Loeffler and Edwin Klebs: *Untersuchungen über die Bedeutung der Mikroorganismen für die Entstehung der Diphtherie*, Mitth., a. d. k. Gesundheitsamte, Berlin, 1884, ii, 451–499.

Pneumonia—1884—A. Fraenkel: *Bakteriologische Miltheilungen*, Zeitschrift für klinische Medicin, Berlin, 1885, x, 401–461.

Epidemic Meningitis—1887—Anton Weichselbaum: *Ueber die Aetiologie der akuten Meningitis*, Fortschritte d. Med., Berlin, 1887, v, 573; 620.

Plague—1894—S. Kitasato and Alexander Yersin: *The bacillus of bubonic plague*, Lancet, London, 1894, ii, 428–430.

Dysentery—1897—K. Shiga: *Ueber den Dysenteriebacillus*, Centralbl. f. Bakt., Jena, 1898, xxiv, 817; 870.

Sleeping Sickness—1901—J. Everett Dutton and Sir David Bruce: *Preliminary note upon a trypanosoma occurring in the blood of man.* Thompson Yates Lab. Reports, Liverpool, 1902, iv, 455–468.

Syphilis—1905—Fritz Schaudinn: *Vorläufiger Bericht über das Vorkommen von Spirochaeten in syphilotischen Krankheitsprodukten und bei Papillomen*, Arb. a. d. k. Gesundheitsamte, Berlin, 1905, xxii, 527–534.

EPIDEMIC DISEASES

Case 1

Girolamo Fracastoro (1478–1553)

De contagionibus et contagiosis morbis et eorum curatione . . . p. 77, Opera Omnia, Venetiis, apud Iuntas, 1574. Fracastoro distinguished between three categories of infection: "by contact, by fomites, and at a distance," the last named being that intangible and at the time hypothetical *contagium*, which we now know as a "contagium vivum," or as bacteria.

Athanasius Kircher (1602–1680)

Contagiosae lues, quae dicitur Pestis, origo, caussae, signa . . . Lipsiae, apud Haered, 1659. One of the first scientists to use a microscope, Kircher saw in his specimens what he thought were worms: we know that what he saw were pus cells and red blood-corpuscles. This marked the beginning of the realization of a *contagium vivum*.

Francisco Redi (1626–1694)

. . *Experimenta circa generationem insectorum* . . . Amstelaedami, apud Wetstenium, 1686. Redi refuted the long-believed theory of spontaneous generation, by wrapping thick gauze around a piece of meat, and proved that maggots, attracted by the smell of the meat, laid their eggs on the gauze.

Johann Lucas Schoenlein (1793–1864)

Zur Pathogenie der Impetigines. The founder of modern clinical teaching in Germany, he endeavored to classify diseases, and was one of the first to report a fungus as the aetiological agent of the disease favus. (Müllers Archiv für Anatomie, Physiologie und wissenschaftliche Medicin, Berlin, 1839, p. 82.)

Casimir Davaine (1812–1882)

Recherches sur la nature et la constitution anatomique de la palustre maligne. (Comptes rendus . . . des séances de l'Acad. des Sciences, Paris, 1865,

vol. 60, p. 1296.) Davaine gave the first confirmation of the bacterial origin of disease.

CARL JOSEPH EBERTH (1835–)

Die Organismen in den Organen bei Typhus abdominalis. (Virchows Archiv für pathologische Anatomie und Physiologie, Berlin, 1880, p. 58.) Discovery of the typhoid bacillus. Schoenlein had been the first to differentiate between *typhus abdominalis* and *typhus exanthematicus.*

ALPHONSE LAVERAN (1845–)

Physiologie pathologique de la nature parasitaire des accidents de l'impaludisme. (Compt. rend., etc., Paris, 1881, vol. 83, p. 627.)

WILLIAM T. COUNCILMAN AND HENRI A. LAFLEUR

Amoebic dysentery. (Johns Hopkins Hospital Reports, 1891, vol. 2, p. 395.)

WILLIAM H. WELCH AND GEORGE H. F. NUTTALL

A gas-producing bacillus (bacillus aerogenes capsulatus, nov. spec.) Capable of rapid development in the blood-vessels after death. (Johns Hopkins Hospital Bulletin, 1892, vol. 3, p. 81).

WALTER REED (1852–1901)

The etiology of yellow fever. A preliminary note. (Philadelphia Medical Journal, 1900, vol. 6, p. 790.)

F. W. TWORT

An investigation of the nature of ultra-microscopic viruses. (Lancet, 1915, vol. 93, pt. 2, p. 1241.) Twort was an investigator of Bacteriophage and filterable viruses.

HEART, LUNGS, INTESTINES

Gallstones

Matthew Baillie, *Morbid anatomy of the human body*, London, 1812. Fasc. V, Plate VI.

Ulcers of Stomach

Matthew Baillie, *Morbid anatomy of the human body*, London, 1812. Fasc. III, Plate V.

Cancer of Rectum

Matthew Baillie, *Morbid anatomy of the human body*, London, 1812. Fasc. IV, Plate IV

Laennec examining a patient at l'Hôpital Necker, with his newly discovered stethoscope.

Drawings of tuberculous lungs, from *L'Auscultation Médiate*, Paris, 1826.

Aortic Aneurysm

Matthew Baillie, *Morbid anatomy of the human body*, London, 1812.

Arteriosclerosis of Aorta

Johann Jacob Wepfer, *Observationes medico-practicae de affectibus capitis internis et externis* . . . Scaphusii, 1727.

Ossification of Lungs

PLATE VI

Matthew Baillie, *Morbid anatomy of the human body*, London, 1812. Fasc. I, Plate II.

Ossification of Semilunar Valves of Heart

Matthew Baillie, *Morbid anatomy of the human body*, London, 1812. Fasc. I, Plate II.

HEART, LUNGS, INTESTINES

Case 2, Heart

RICHARD LOWER (1636–1691)

Tractatus de corde item de motu et colore sanguinis et chyli in eum transitu . . . Londini, typis J. Redmayne, 1670. Lower was an experimental physiologist—a reflector of the same dynamic spirit that activated Harvey. He was the first to do direct blood transfusions from one animal to another.

RICHARD WISEMAN (1622–1676) OF AN ANEURYSMA

Several chirurgical treatises . . . London, 1686, chap. XVI, p. 70. Here Wiseman, who is primarily a surgeon, attempts to classify an aneurysm, and to distinguish between different kinds of aneurysms. He was one of the most skilful surgeons of his time, and is particularly known for his treatise on the King's Evil, for which he unhesitatingly recommends the Royal Touch as above all other remedies.

RAYMOND VIEUSSENS (1641–1715)

Novum vasorum corporis humani systema, Amstelodami, apud Paul Marret, 1705. Vieussens, a professor at Montpellier, made a specialty of studying the position and structure of the heart, and was one of the first to study heart diseases apart from other diseases, and to distinguish between the different kinds of heart disease.

JO. MARIA LANCISI (1654–1720) AORTIC ANEURYSM

Opera varia . . . Venetiis, 1739. Lancisi, although still somewhat of a humoral pathologist, saw that organic defects were responsible for certain ailments.

JOHN FOTHERGILL (1712–1780) ANGINA PECTORIS

Collection of medical and philosophical works . . . London, 1781, p. 508, Case XXII, *Case of An Angina Pectoris.* Although primarily a practitioner, Fothergill was a keen observer of pathological conditions, and saw hundreds of cases give authority to his statements.

JEAN-NICOLAS CORVISART (1755–1821)

Essai sur les maladies et les lesions organiques du coeur et des gros vaisseaux . . . Paris, l'imprimerie Migneret, 1806. The first to appreciate Auenbrugger's book on percussion, Corvisart translated it into French in 1808, thereby insuring its authority. Corvisart was a great diagnostician and clinical teacher, and was able to distinguish between functional and organic heart disease, and between hypertrophy and dilatation of the heart.

RENÉ-THÉOPHILE-HYACINTHE LAENNEC (1781–1826)

De l'auscultation médiate ou traité du diagnostic des maladies des poumons et du coeur . . . 2 vols., Paris, chez Brosson et Chaudé, 1819. The first edition of the famous book that was to revolutionize clinical procedure.

RUDOLF VIRCHOW (1821–1902)

Thrombose und Embolie, (Klassiker der Medizin, Leipzig, 1910).

Case 3, Lungs

AMBROISE PARÉ (1510–1590) PLEURISY

Les *Oeuvres* . . . 8^{e} édition, Paris, 1628. Chapter X, p. 297, *Des Tumeurs en Particulier*.

MARCELLO MALPIGHI (1628–1694)

Opera Omnia . . . London, 1686, *De Pulmonibus*. Malpighi, another exponent of the dynamic physiological anatomy of the 17th century, established with his microscope the fact of capillary anastomosis, which Harvey had surmised through physiological experiment and deduction.

THOMAS WILLIS (1621–1675) PLEURISY

Practice of Physick . . . London, 1684, section I, chap. IX, p. 64.

LEOPOLD AUENBRUGGER (1722–1809)

Inventum novum ex percussione thoracis humani ut signo abstrusos interni pectoris morbos de tegendi, Vindobonae, Jo. Thom. Trattner, 1761. The first edition of a book which was not recognized until it was translated by the great French clinician Corvisart in 1808.

MATTHEW BAILLIE (1761–1823)

The morbid anatomy . . . of the human body . . . London, 1793. Chap. IV, *Diseased appearances of the Lungs. Inflammation.* This book, and the atlas accompanying it, treats of pathology as an independent science.

JEAN CRUVEILHIER (1791–1873) LOBAR PNEUMONIA

Anatomie pathologique du corps humain . . . Paris, Baillière, 1829–1835. Plate III, Book II. In the great period of pathology in France, Cruveilhier was widely acclaimed, in spite of some serious errors in his diagnoses and observations.

Case 4, Intestines

MATTHEW BAILLIE (1761–1823)

The morbid anatomy . . . of the human body . . . London, 1793. Chap. VIII, *Diseased appearances of the intestines.*

JEAN FERNEL (1497–1558) APPENDICITIS

Universa medica . . . Genevae, 1679. An early description of appendicitis, called here *coarction of the intestine.*

LAURENTIUS HEISTER (1683–1758) APPENDICITIS

Medicinische chirurgische und anatomische Wahrnehmungen, Rostock, 1753. A leading German surgeon, whose book was a case history from a pathological point of view.

MATTHEW BAILLIE (1761–1823)

The morbid anatomy . . . of the human body . . . Chap. VIII. *Diseased appearances of the intestines. Inflammation.*

JEAN CRUVEILHIER (1791–1873) CANCER OF THE STOMACH

Anatomie pathologique du corps humain . . . Paris, 1829–1835. Plate I, Book XXVII.

NATHAN SMITH (1762–1829) TYPHOID

Medical and Surgical Memoires, Baltimore, 1831. "Typhus Fever."

PIERRE CHARLES ALEXANDRE LOUIS (1787–1872) TYPHOID

Anatomical, pathological and therapeutic researches upon . . . gastro enterite . . . translated by Henry I. Bowditch, 2 vols., Boston, 1836.

ENDOCRINE-URINARY

Exophthalmic Goitre

Picture from Heinrich Curschmann, *Klinische Abbildungen*, Berlin, 1894.

Abscessed Kidneys

Matthew Baillie, *Morbid Anatomy of the Human Body*, London, 1812, Fasc. VI, Plate IV.

Portraits

Carl A. von Basedow

Richard Bright

Six pictures showing contents of normal and diseased urine, from P. Rayer, *Traité des Maladies des Reins*, 1837–1841; uric acid, urates, phosphates, blood cells, pus cells, albumen.

ENDOCRINES

Case 6

Photograph of a 13th century figure on Rheims Cathedral, reproduced from Leonard Mark's *Acromegaly, a personal experience*, London, 1912.

CALEB HILLIER PARRY (1755–1822)

Enlargement of the thyroid gland in connection with enlargement or palpitation of the heart. From: Collection from the unpublished medical writings of Caleb Hillier Parry, London, 1825.

ARNOLD ADOLF BERTHOLD (1803–1861)

Transplantation der Hoden. Archiv für Anatomie, Physiologie und wissenschaftliche medicin, 1849, p. 42.

SIR WILLIAM W. GULL (1816–1890)

On a cretinoid state supervening in adult life in women. An early and striking description of the cause of myxoedema, and one of the first to point it out.

THOMAS ADDISON (1793–1860)

On the constitutional and local effects of disease of the supra-renal capsules. London, 1885 (Klassiker der Medizin, 1912).

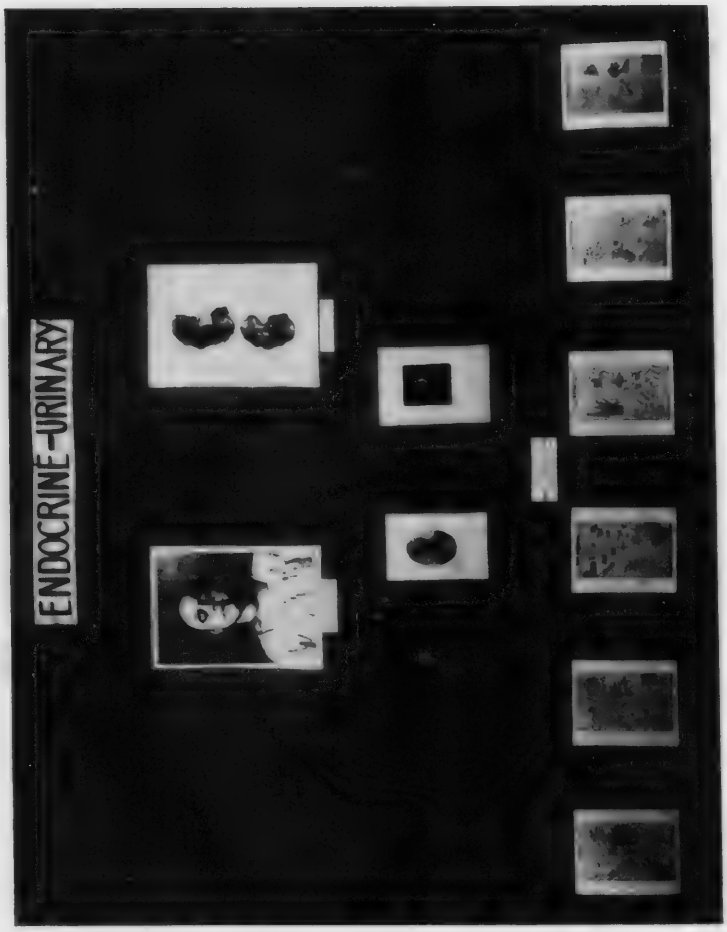


PLATE VII

J. VON MEHRING AND OSCAR MINKOWSKI

Diabetes mellitus nach Pankreasextirpation. Archiv für experimentelle Pathologie und Pharmakologie, 1890, vol. 25–26, p. 371.

PIERRE MARIE (1853–)

Essay on acromegaly, first published in the Revue de Médecine, Paris, 1886, translated and published by the New Sydenham Society, London, 1891. One of the first publications to point out the pituitary lesion in cases of acromegaly.

G. R. MURRAY

Remarks on the treatment of myxoedema with thyroid juice, with notes of four cases. British Medical Journal, London, 1892, vol. 2, p. 449. The first definitely successful attempt at endocrine therapy.

GEORGE OLIVER AND E. A. SCHÄFER

On the physiological action of extract of the suprarenal capsules. Proceedings of the Physiological Society, London, 1894, vol. 16, p. 491.

GEORGE OLIVER AND E. A. SCHÄFER

On the physiological action of extracts of pituitary body and certain other glandular organs. Journal of Physiology, 1895, vol. 18, p. 277.

JOHN J. ABEL

Further observations on the chemical nature of the active principle of the suprarenal capsule. Johns Hopkins Hospital Bulletin, 1898, vol. 9, p. 215.

WILLIAM H. HOWELL

Physiological effects of extracts of the hypophysis cerebri and infundibular body. Journal of Experimental Medicine, 1898, vol. 3, p. 245.

WILLIAM G. MACCALLUM

On the relation of the parathyroid to calcium metabolism and the nature of tetany. Johns Hopkins Hospital Bulletin, 1908, vol. 19, p. 91.

URINARY

Case 7

GUGLIELMO SALICETO (c. 1210–1277)

Durities in renibus. Liber in scientia med. fol. Placentiae, 1476, chap. 140.

MARCELLO MALPIGHI (1628–1694)

De renibus. Opera Omnia, London, 1686.

M. WALTER

Recherches sur quelques maladies des reins et de la vessie urinaire . . . 1792. Plate VII, bladder of a woman aged 45, showing a "fleshy mass."

RICHARD BRIGHT (1789–1858)

Reports of medical cases . . . Guy's Hospital Reports, London, 1827, vol. 1. The famous description of nephritis, with the distinction between cardiac and renal dropsy.

JEAN CRUVEILHIER (1791–1873)

Anatomie pathologique du corps humain . . . Paris, 1829–1835. *Maladies du Rein*, showing urethral calculi, suppurated infiltrated nephritis, etc.

BENJAMIN BRODIE (1783–1862)

Lectures on the diseases of the urinary organs. London, 1832.

PIERRE RAYER (1793–1867)

Traité des maladies des reins . . . Paris, Baillière, 1840. Rayer was a versatile researcher, writing on dermatology as well as on urology.

SIR HENRY THOMPSON

Clinical lectures on diseases of the urinary organs . . . London, 1888.

FELIX GUYON (1831–)

Leçons cliniques sur les maladies des voies urinaires . . . 2 vols. Paris, Baillière, 1894.

NEUROLOGY

Case 8

THOMAS WILLIS (1621–1675)

Pathologiae cerebri et nervosi generis specimen, in quo agitur de morbis convulsivis et de scorbuto . . . Amstelodami, 1668.

ROBERT WHYTT (1714–1766)

Observations on the nature, causes and cure of those disorders which are . . . *called nervous, hypochondriac or hysteric* . . . Edinburgh, 1768.

CHARLES BELL (1774–1842)

A series of engravings explaining the course of the nerves. London, 1803.

Idea of a new anatomy of the brain. London, 1811.

The nervous system of the human body . . . London, 1830.

SILAS WEIR MITCHELL (1830–1914)

Injuries of nerves and their consequences. Philadelphia, 1872.

Fat and blood and how to make them. London, 1878.

JEAN-MARTIN CHARCOT (1825–1893)

Leçons sur les maladies du system nerveux . . . Paris, 1886.

Vol. 2, Plate II, illustrating paraplegia.

Vol. 7, Plate II, illustrating chronic articular rheumatism, and alterations in the mitral valve in chronic articular rheumatism.

Lectures on the pathological anatomy of the nervous system. Diseases of the spinal cord. Translated by Cornelius G. Comyges, Cincinnati, 1881.

DERMATOLOGY

Plates from Pierre Rayer's *Atlas des maladies de la peau.* Paris, 1826–1827. "Vesicules, pustules, inflammations, tumeurs, tubercules, papules."

Skin diseases have constantly required some sort of classification, and so the remainder of the dermatological exhibit is occupied with outlines of skin diseases made by the leading dermatologists from the 16th century on, under headings indicative of disease conceptions of the times.

HUMORAL— Hippocrates—1750.

Hieronymus Mercurialis (1530–1606).

Samuel Hafenreffer (1587–1660).

DERMATOLOGY
HUMORAL
PATHOLOGICAL - ANATOMICAL
SYSTEMATIC

PLATE VIII

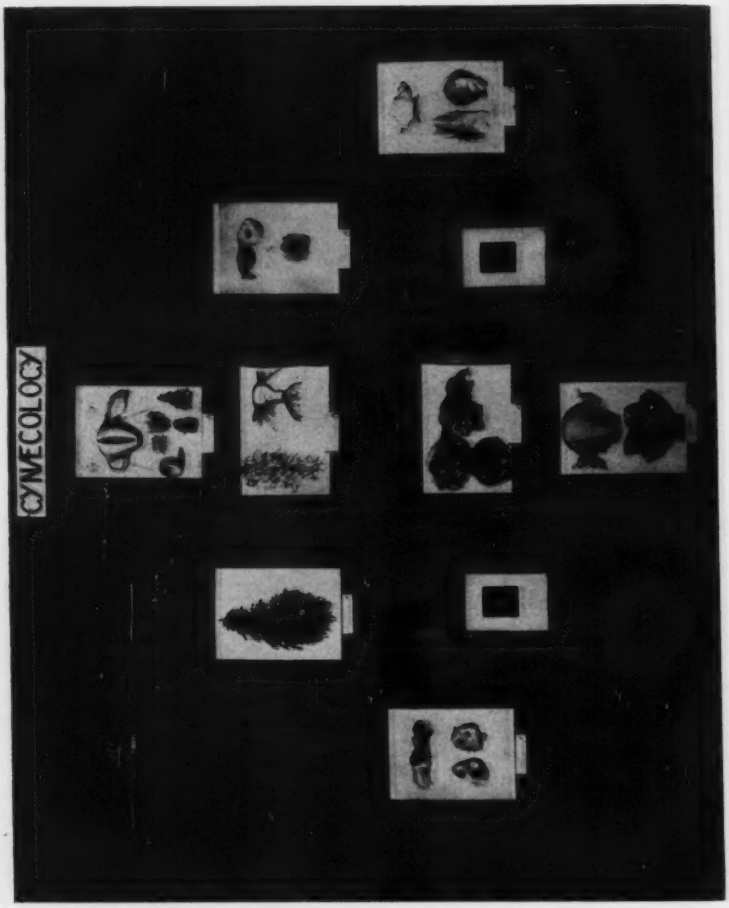


PLATE IX

SYSTEMATIC—1750–1850.
Joseph Jacob von Plenck (1738–1807).
Willan-Bateman (1817).
Jean Louis Alibert (1766–1837).
Pierre Rayer (1793–1867).
PATHOLOGICAL-ANATOMICAL—1850–1880.
Ferdinand von Hebra (1816–1880).
Sir William James Erasmus Wilson (1809–1884).

GYNAECOLOGY

Hydatidiform moles
Frederic Ruysch: *Thesaurus animalium primus*, Amstelodami, 1744.
Robert Hooper: *Morbid anatomy of the human uterus*, London, 1828.
Hydatidiform mole and tumor of Fallopian tube.
Matthew Baillie: *The morbid anatomy of the human body*, London, 1812, Fasc. IX, Plate VIII.
Uterine polyps
Frederic Ruysch: *Observationum anatomico-chirurgicarum centuriae.* Amstelodami, 1691.
Ovarian cyst
Matthew Baillie: *Morbid anatomy of the human body*, London, 1812. Fasc. IX, Plate VI.
Ovarian tumor
Robert Hooper: *Morbid anatomy of the human uterus.* London, 1828.
Cancer of the uterus
Matthew Baillie, *Morbid anatomy of the human body.* London, 1812. Fasc. Ix, Plate I.
Thrombo-phlebitis of uterus, and puerperal endometritis
Jean Cruveilhier: *Anatomie pathologique du corps humain* . . . Paris, Baillière, 1829–1835
Portraits
Frederic Ruysch (1638–1731).
Matthew Baillie (1761–1823).

GYNAECOLOGY

Case 9
FRANCOIS MAURICEAU (1637–1709)
Traité des maladies des femmes grosses . . . Paris, Houry, 1694. Mauriceau was the leading gynaecologist of his time. He ascertained that pelvic bones are not separated during a normal labor, and was one of the first to note the wide spread of puerperal fever.
Portrait of Mauriceau

NICHOLAS CULPEPER (1616–1654)

A directory for midwives . . . London, 1681. Culpeper is sometimes classified as a quack, but this book for midwives showed much common sense in observation and application.

FREDERIC RUYSCH (1638–1731)

Thesauri animalium sexti . . . Amstaelodami, 1774. Plate IV, Thes. VI: a hairy mass found in a pregnant uterus.

JEAN ASTRUC (1684–1766)

Tractatus de morbis mulierum . . . Venetiis, 1763.

JEAN CRUVEILHIER (1791–1873) CANCER OF THE UTERUS

Anatomie pathologique du corps humain . . . Paris, Baillière, 1829–1835. Plate III, Book XXXIX.

SIR ASTLEY PASTON COOPER (1768–1841) HYDATID CYSTS OF THE BREAST

Anatomy and diseases of the breast . . . Philadelphia, 1845. A popular surgeon and a brilliant clinician, Cooper was one of the pioneers in experimental surgery, and in the difficult surgery of the vascular system.

T. SPENCER WELLS (1818–1897)

Diseases of the ovaries: their diagnosis and treatment. New York, 1873.